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ABSTRACT

The manual is designed to provide guidelines for developing basic educational components in manpower programs for youth from poverty backgrounds who dropped out of school before graduating from high school and whose educational deficiencies reduce their employability or their ability to profit from training programs. It discusses relevant theoretical principles, reviews the significant approaches to the problem, and outlines the elements of an education component for manpower programs which reflects the current state of the art. Chapters cover the following topics: goals of an education component, the reading process, reading problems, proposed remedial strategies, the mathematics unit, the advanced general education unit, principles and application, diagnosing and testing, and program design. Three brief appendixes provide background information; a list of supplementary materials related to reading, language skill, and mathematics; and a bibliography. (Author/JR)

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AN EDUCATION MODEL FOR MANPOWER PROGRAMS:

A MANUAL OF RECOMMENDED PRACTICES

by

Regis H. Walther

February, 1975

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16. Abstracts: This work is a manual of principles and practices to provide an effective basic education component for manpower programs. It is based on extensive research concerning education for youth in manpower programs, together with a comprehensive review of the literature and extensive reconnaissance of exemplary programs; and it incorporates the results of extensive demonstration project experience. The model education component described in this manual is an elaboration of the New Education Program developed by the Graham Associates, which, in turn, is an elaboration of the Job Corps Programmed Learning System. Although designed as a practical resource for program administrators and teachers in manpower programs, the manual should be useful to anyone concerned with the provision of effective basic education.

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I.
INTRODUCTION

This manual has been prepared to provide guidelines for developing basic education components in manpower programs. It includes a discussion of relevant theoretical principles, a review of the significant approaches to the problem, and a description of the elements of an education component for manpower programs which reflects the current state of the art.

The component outlined in this manual is directed primarily toward the needs of youth from poverty backgrounds who dropped out of school before graduating from high school, who are participating in manpower programs, and whose educational deficiencies in basic academic skills reduce their employability or their ability to profit from training programs. The curriculum and teaching techniques described in this manual should be reasonably effective with most trainees.

When trainees have severe problems of vision, hearing or mental retardation, however, they cannot be expected to benefit from this program; and they should be referred to programs specializing in providing service for their particular problems. The determination that visual and hearing problems are of such severity that special attention is required can usually be made in an objective and reliable manner. A comparable determination of mental retardation is much more difficult and the chances of making a misdiagnosis much greater.

A student from an intellectually impoverished background with minimal reading skills may be judged mentally retarded when, in fact, he has substantial ability to learn. Care needs to be exercised so that a premature decision on inability to benefit is not made. Procedures to be used in making determinations concerning each of these problems will be discussed in more detail later in this manual.

This manual is based on information and insights developed from a review of relevant literature and research, on-site visits to exemplary programs, a series of workshops with practitioners working with programs designed to teach the educationally disadvantaged youth, and four longitudinal research studies of education components within manpower programs. A detailed description of the information net and analysis strategy is contained in the Appendix.

While the education component described in this manual has been developed specifically for recent school dropouts, its approach and many of its recommendations are not limited to young disadvantaged dropouts. The manual should be useful in the planning of basic education for all individuals with deficient academic skills.

The need for basic education

Among students of the employment problems of teenage dropouts, there is virtually complete agreement that low reading and arithmetic skills are a serious impediment to the dropouts' satisfactory employment. The dropouts' skills are typically less than might be assumed from their completed school grades. More often than not, the achievement level of a school dropout is far below the average for his class; and it is not unusual to find a tenth grade dropout reading at-- or

even below -- the sixth grade level. There are even some students with high school diplomas who are functionally illiterate.

The extent of the need for better academic skills nationally is reflected in the following statement prepared by the Office of Economic Opportunity in 1969.

> (1) Half the unemployed youth between 16 and 21 years old read, write, and compute below the fourth grade level.
> (2) There are eight million poor adults, ages 16 to 24, who are severely educationally disadvantaged. Of these, about 4.3 million are family heads responsible for the care, inspiration and motivation of some 12 million children.
> (3) There are some 2 million poor undereducated wives and mothers, plus 1.7 million poor undereducated unrelated persons living in families with male heads.
> (4) From fourteen to twenty million people are neglected educationally and fall into the low literacy or illiteracy categories.

The problem of the employment of the undereducated has become steadily more acute because in modern society the hiring requirements for competence in reading and arithmetic skills have been steadily increasing. Because of increased technological change, furthermore, workers can expect to have to change their jobs several times during their work careers. Old jobs are constantly being phased out, and new jobs, created: the worker is constantly required to learn new skills or adapt himself to new situations. Very few jobs remain exactly the same and reading is a primary means by which individuals acquire new information and new skills. A long period of apprenticeship during which an employee learns his job through experience and by example from an experienced worker is becoming increasingly rare.

It should be noted also that, even if the person with poor academic skills can find a job with minimal reading requirements, he is likely to find that the job

is a dead end and that he has limited opportunity for promotion as long as his reading skills are poor. During times of rising unemployment, furthermore, it is usually the non-skilled or semi-skilled worker, whose low salary precludes his saving money, who is laid off first; and his lack of skills tends to prolong his unemployment.

Education is also increasingly important for other aspects of living in an adult world. If a person is not a competent reader, he may be unable to acquire information from newspapers, periodicals and instruction manuals that is essential to successful adult performance. Lack of reading competence and the consequences of reading incompetence may have a significant effect on the individual's self-image.

The reasons why a large number of people have lower academic skills than would be useful to them in their everyday life are varied and complex. One explanation may be that, when these people were being educated, the schools had not fully accepted the responsibilities imposed on them by the requirements of compulsory education. Historically, school systems trained the elite of a society to occupy a relatively few high status social and occupational roles. The educational ladder served as a selection process in which, at various stages, the academically more able or the socially better connected progressed to a higher level and those less able or with poorer social connections dropped out. The performance of teachers tended to be judged on their ability to develop superior students. There was much less interest in the student who performed poorly. It was felt that it was up to the student to take advantage of the educational opportunities available to him. If he was a poor student it could be either because he didn't make the

effort or didn't have the ability. In the days before compulsory education became public policy these students would drop out of school. Compulsory education laws meant that many more students stayed in school, but their education was not necessarily extended. Social promotion policies apparently have been followed in many schools with the students who behave themselves being moved up as they outgrow their desks. They get their diploma by putting in their time, even though they have not mastered the skills which are intended to be a prerequisite to high school graduation.

In the last few years schools have devoted considerable attention to the problem of academic underachievers, and there is evidence that school systems are making more of an attempt to educate everyone. Perhaps, in a few years, the performance of schools may improve; and perhaps compulsory education may then result in a genuine high school education for all students. In the meantime there are large numbers of former students whose academic deficiencies impede their employability in the current labor market.

Research within urban Neighborhood Youth Corps out-of-school programs has shown that these youth are frequently unable to profit to any marked degree from either conventional schools or from conventional adult education programs run by the school system. Very few return to school full-time and, of those who do, almost none complete any meaningful segment of the high school program.

School records of academic underachievers often reveal a pattern of poor school adjustment, and truancy in addition to low achievement. Case histories often suggest, furthermore, that rejection by school, home, and the larger community has engendered basic insecuri-

ties, damaged self-images, expectations of failure, and inward hostilities that often result in a behavioral style characterized by indifference, discontent, passivity or belligerence. For large numbers of disadvantaged youth, deficits in the area of education, coupled with cultural disadvantage, have been the prelude to poor performance in the world of work. Discernible factors in their poor vocational experiences are inadequate information and communication skills.

While difficult, the remediation of this situation is not as hopeless as the above statements would suggest. Although the odds are formidable, many disadvantaged youth have had successful educational experiences. We have attempted in this manual to pull together what seem to have been the essential elements in the successful educational experiences of disadvantaged youth. We believe that effective education components <u>can</u> be developed and that they can substantially improve the situation of a significant number of trainees.

II.

GOALS OF AN EDUCATION COMPONENT

Education components of manpower programs should have specific and attainable goals. It is both undesirable and impractical to develop an alternate school system for the undereducated products of the existing school system. The goal of a manpower educational program should be to increase, as directly and as efficiently as possible, the employability-related academic skills of its students.

Manpower educational programs should focus on students who have not completed high school or, if they have completed high school, who still have reading and arithmetic deficiencies that reduce their employability. Operationally this deficiency level can be considered to be performance on standardized tests that places the student below the 8th grade level. Students with this level of deficiency will have experienced long periods of academic failure and will have low confidence in their ability to learn. Their expressed motivation to participate in educational programs will tend to be low. They will tend to react negatively to testing, will be easily frustrated, and will tend not to persevere in pursuing academic goals.

For reasons which will be discussed in more detail later, there is no magic formula that will spectacularly reverse a lifetime pattern of learning difficulties. On the contrary, academic gains can be expected to be

modest and progress, to be slow. A review of the research indicates that the average gain in reading ability for disadvantaged students involved in large-scale programs (100 or more students) is about 1/2 a grade level for every 100 hours. This is approximately the gain made by middle class children in elementary schools. This rate of gain may not seem very impressive, but it is twice the progress made by disadvantaged children in elementary schools. For the disadvantaged youth or adult it is a good rate of progress.

A manpower educational component that can increase the reading skill of the students by one or two grades should feel that it has been about as successful as it can expect to be. Within the time limits of such programs greater gains than this for any substantial number of students within the setting of the manpower program are probably impractical. Apart from and underlying any goals described in terms of academic progress, the goal of the component should be to attempt to increase the interest of the student in education, change his convictions about his ability to learn, and demonstrate that academic skills can be useful in life's pursuits. If success is achieved in making these attitudinal changes, the student may be able to progress by himself through self-instruction or through other programs within the school or community college systems.

Program reports of spectacular improvement in academic skills over a short period of time almost undoubtedly reflect artifacts in the testing situation, since a significant proportion of the gain in test scores probably reflects factors other than real change in achievement level. Some of these testing artifacts are discussed below.

In the first place, students from disadvantaged backgrounds often are poorly motivated in test situations and their initial test scores often do not reflect their true achievement level. If the program increases their motivation, and thereby produces greater effort in the follow-up tests, spectacular gains in test scores may result. These gains are primarily measures of improved motivation. Secondly, test scores are influenced by test-taking strategies employed by the student. If the program teaches test-taking strategies, scores can be influenced markedly without any real change in content mastery. The third factor, more apt to be present among older students, is that if the student has been away from the classroom for any substantial period of time his academic skills may have been reduced through lack of use. As in all other skills, there is a fast recovery when the academic skill becomes reemployed and the increase in test scores may reflect a recovery of former skill levels. In studies reporting spectacular gains in a short period of time, a substantial proportion of the gain is probably accounted for by one or a combination of the above three factors. The presence of artifact "achievement" can be suspected when a high rate of progress does not continue after the initial spurt.

While the immediate performance goals of the program usually should be modest, teachers should keep in mind that the long range goal is to make the students functionally literate and, ultimately, to help them attain certifications valued by society.

The needs of the students included within the educational program can be expected to vary over a wide range. All will have some academic deficiencies, although the extent will vary from those who are almost

ready either to complete high school or to pass the GED to those who are functionally illiterate. It is doubtful whether any student, however, will be starting completely from scratch with no reading skills whatsoever. Even the poorest reader can be expected to have mastered some aspect of the reading task, and to have been enrolled in school for nine or ten years. There will also be a wide range in their attitudes and innate abilities. Some will have adequate motivation to complete an academic program and will need primarily the opportunity either to complete high school or to pass the GED. Our research indicates that only a small number fall in this category. Most persons of this type are able to use conventional educational resources without assistance.

Most academic underachievers have serious problems with respect to achievement. Their reactions can take two divergent directions. Some react by losing confidence in themselves and developing a low self-esteem. Others react by rebelling against the requirements of authority and act out through delinquent or criminal behavior. Finally, some students suffer from innate learning disabilities. These disabilities may be general in scope and interfere with all types of learning. Such situations are relatively easy to diagnose because the individual shows retardation in all aspects in his adaptation to life situations. Other individuals have specific disabilities with respect to the communications tasks. These situations are extremely hard to diagnose because there are so many other causes of learning disability besides lack of innate ability. The teacher should recognize the possibility that such situations do exist but should be careful not to exaggerate their extent. Most enrollees in manpower programs probably have the innate ability to learn academic skills.

Setting individual goals

The teacher faced with this wide range of needs has a difficult job determining educational program priorities. It can be argued that the teacher should be concerned with any kind of learning that helps the enrollee adjust to his life situation. This would include any aspect of communication skills and other types of coping skills. Such a goal is probably desirable but very likely beyond the competence of the teacher. Perhaps the teacher should attempt to make whatever contribution is possible in these areas but should recognize that it is most important to focus on improving the reading and arithmetic skills of the student.

In our society certifications are used to represent skill levels. A high school diploma is interpreted by many employers to indicate the possession of a certain level of academic skills, and the absence of the diploma indicates that these skills are not possessed. As a matter of fact there are many high school graduates with very deficient academic skills; and many non-graduates who function quite adequately. The individual without the certificate, nevertheless, frequently runs into trouble and the student is better off with a high school diploma than without it. Whenever possible, the program should try to help the enrollee complete graduation in formal educational programs. If this goal is not achievable, an alternative certification such as the General Education Development (GED) certificate should be established as the goal.

While recognizing the importance of standard academic goals, it should be recognized that the achievement of a high school diploma or a GED is not a realistic goal for many enrollees. The program should be careful not to emphasis such achievements to the extent that

students who do not gain a high school diploma or a GED experience further failure. The program should be sufficiently flexible so that achievable goals can be established for everyone, even though the goal may be as limited and short-ranged as to involve no more than helping the enrollee to read those things which he can say. This requirement puts a great responsibility on the teacher and requires great ingenuity, imagination and effort in the goal-setting phase of the program. In cooperation with the enrollee, the teacher should set goals which are attainable. The proper setting of individual goals should result in realistic achievement for a large proportion of students. At the outset the teacher should be satisfied with small levels of achievement. The teacher should not overlook, however, the fact that many of his students are capable of a great deal more achievement than was possible for them in the past and that, after the first-level goals are achieved, further and more ambitious goals may become possible.

III.

THE READING PROCESS

A basic education program should have the capacity to help students to improve their skills in three academic subject areas: reading, mathematics, and advanced general education. Of these three areas, reading is often of primary importance; because reading ability is a prerequisite to achievement in the other subject areas. Apart from its crucial role in school achievement, reading competence is of great and obvious importance to the individual who is no longer in school. In both school and later activities; the individual ordinarily uses reading for two important purposes: getting information, and solving problems. While the individual may obtain information and solve problems without being able to read, competence in reading greatly enchances the individual's ability in both of these areas.

Reading as a communication skill

In order to adapt to their environments, all individuals must acquire communication skills. Important communication skills include:

1. Observation--obtaining meaning from non-verbal sensory inputs.

2. Action--communicating meaning to other people through non-verbal behavior.

3. Listening--obtaining meaning through oral symbols.

4. Speaking--communicating through oral symbols.

5. Reading--obtaining meaning through graphic symbols.

6. Writing--communicating through graphic symbols.

All six of these methods of communication are used by literate persons in everyday life. The non-verbal methods--observation and action--develop first. Very early in life, a baby starts attaching meaning to the information he receives through his senses (observation) and learning how to behave (action) in order to achieve some desired result.

As a child gains in experience he organizes his observations into categories and treats instances of the categories as, in some respects, equivalent. He finds, for example, that some things are good to eat and others are not, and that some people are friendly and others are not. Categorization of this type may occur long before any language is developed; and concepts and rules are learned which cannot easily be put into words even when competence in language has been achieved. For example, a person may learn to distinguish among hundreds of faces without being aware of why he recognizes that one face is different from another. If you ask him how John differs from Bill he will have to think about it and often will not be able to pinpoint the

distinguishing characteristics which he is using to identify these two individuals. Interpretations of sensory information therefore are often independent of language and in most instances are made automatically upon the receipt of sensory information without the individual being aware of the factors which influence his interpretation.

As a method of communication action can be either intentional or unintentional. Gestures, facial expressions, body orientation, and other actions are frequently used intentionally as a way of communicating meaning to another person. The hitchhiker who puts out his thumb, the baby who holds out his arms or the policeman who holds up his hand have very definite messages which they mean to communicate. There is also a wide range of individual behaviors which are not performed consciously for purposes of communication; but which are interpreted by the observer as having a specific meaning. Such observations are an important part of non-verbal communication and are heavily relied on in interpreting meaning in interpersonal situations. For example, concentrated attention communicates interest; a slight shaking of the head may communicate disaproval; or a leaning away from the speaker may communicate indifference.

While non-verbal communication can and does occur independent of language, the use of formal language (oral communication) greatly enhances an individual's capacity to cope with his environment. A child with normal hearing typically attempts to talk at one or two years of age and gets feedback from the people around him as to the degree to which he is communicating successfully. In the process of mastering oral communication, the child learns how to enunciate sounds, how to put sounds together into words, and how to put words together

into sentences. In a period of several years, the child will have learned the meaning of thousands of words and will have mastered a complex set of grammatical rules without anyone having systematically attempted to teach him to speak. The child will learn, for example, that the sentences "Dog bites man," "Man bites dog," and "Man dog bites" have quite different meanings or have no meaning at all. Without being able to explain the rule that he used to determine the meaning of the sentence, he will have discovered and applied a good many language rules.

The mastery of written language (reading and writing), a more difficult task than the mastery of oral communication, normally begins after oral language has been mastered to a considerable degree. Most children learn to speak reasonably well without formal training. Both reading and writing can be mastered without formal teaching, but these skills ordinarily are acquired in school and involve formal instruction. Oral language involves the communication between two people so that feedback on the effectiveness of the communication can be immediate and continuous. Reading is more of a solitary activity, and learning how to read is a process that lacks the automatic, built-in feedback present in the development of oral communication. For the child to learn to read, feedback must be present. Some children enter the first grade reading at the fourth or fifth grade level even though they have received no formal training in reading. Ordinarily, such children will have been read to a great deal, will have learned to value the reading act, and will have ready access to a competent reader who would patiently answer their questions. The person performing this role usually is a parent although sometimes it may be some other adult, an older sibling, or another older child. The achieve-

ment of competence in writing without formal teaching is much rarer but it can happen. Most commonly, the feedback necessary to learning how to read and write is supplied by the structured setting of a school. It is there that the individual usually begins his mastery of written communication.

Whether learned informally at home or formally in school, the necessary conditions for gaining communication skills include: motivation -- the individual must be motivated to spend the time that is required for mastery; opportunity -- he must have the opportunity for ample experience in receiving information at each of the levels -- observational, oral, and graphic; and feedback -- he must receive feedback as needed as to whether his interpretations or actions are competent. Natural curiosity and desire for mastery sufficiently motivate many children to attempt to learn communication skills. As a matter of fact, it would be difficult to design a situation in which a normal child did not learn how to use non-verbal communication and did not next learn how to speak to the people around him. Apart from motivation, the degree of success in acquiring communication skills depends upon the models available, the kinds of experiences available, and the quality of feedback received.

Reading as a problem-solving behavior

The ability to read and write greatly enhances an individual's problem-solving capacity. It provides him with access to a far wider range of information than he could acquire through his own experiences or through oral communications. Through reading, the individual can obtain information from persons he cannot talk to; and through writing, he can record and organize his own thoughts in a formal way. As reading and writing skills increase, they become important adjuncts to the thinking

process, because they stimulate the individual's ability to select, analyze, evaluate, and synthesize information. The skilled reader learns how to acquire information quickly and how to use it in a productive way in developing solutions to problems.

Reading skills

Reading is an exceedingly complex activity requiring many coordinated skills. Adults have forgotten how complex this reading process really is. They recognize instantly almost all the words they read and only occasionally hesitate over an unfamiliar word. When they meet one of the many words that has several meanings, they automatically wait to assign the exact meaning until the context makes it clear. They read words in groups, not one by one, since grouped words express ideas -- the real reading unit. They even find that the precise meaning of a particular sentence may be determined by other sentences with which it is combined. And they have no trouble with the mechanics of reading from left to right and down the page. All this, and much more, adults think of as the single act of reading. They read with an ease made possible by years of practice.

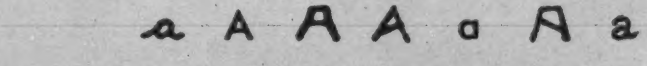
The complexities of the reading task are apparent when one considers the number of skills that must be mastered by the skilled reader.

1. Recognizing graphic symbols

The beginning reader of English must learn to identify and distinguish two types of graphic shapes, the English alphabet and the non-alphabetic signs. The English alphabet consists of a set of twenty-six letters. Each letter has an upper-case form and a lower-case form. Any letter can be shaped in a number of different typefaces or written in a number of cursive styles. The new reader must learn to distinguish the alphabet letters in any shape.

The non-alphabetic shapes consist of word signs, abbreviations and punctuation marks. One set of word signs is comprised of numerals. For each numeral in the Arabic system (e.g., 0, 1, 2) there is a corresponding word which can be spelled (e.g., zero, one, two). Another set of word signs denotes mathematical processes that, like numerals, have corresponding words. The "+," for example, represents "plus or add;" and "-" represents "minus, subtract, or less." The reader also must learn to recognize letter groups as abbreviations (e.g., U.S.S.R. for Union of Soviet Socialist Republics); acronyms (e.g., HUD for Department of Housing and Urban Development); and short forms (e.g., Mr. for mister). Finally, the reader must learn to recognize punctuation marks (e.g., capital letters, periods, explanation marks, question marks, colons, semi-colons, commas and quotation marks): graphic shapes that exist in auditory language only as pauses or as vocal inflections.

The representations of the graphic shapes do not have to be identical in order to be recognized. The student learns to respond to a range of shapes which he treats as equivalent. An experienced reader has no difficulty recognizing that all of the shapes below represent the letter A.



He also will have learned an assortment of shapes which can represent the letter B and will not usually confuse the representations of A with the representations of B. He thus has learned both generalization and discrimination of character forms and is usually able to make his interpretation instantaneously without being consciously aware of his decision process.

2. Word Recognition

The accomplished reader must be able to recognize a large number of words instantaneously. Research has shown that this recognition is not based on a letter-by-letter reconstruction but on the basis of the Gestalt in which the word is recognized as a unit. Complete information about each letter is not required. The reader makes inferences as to what the letter must be on the basis of its position in the word. In the example below the same graphic form is used for an "H" in THE and "A" in CAT. Yet, most readers glancing at the illustration, will read it as "the cat" and not be aware of the fact that the H and the A do not differ in form.

TAE CAT

Sometimes the reader will ignore contradictory information when he decides on the basis of the context that a particular word is meant. Most readers will conclude in the example below that what was meant was "forever yours" and some will actually not be aware of the fact that they have converted a Y into an R.

FOYEVER YOURS

3. Letter-sound correspondence

In our language system the mastery of the oral language and learning the relationship between sounds and letters is clearly an advantage for mastering the written language. It is sometimes said that written language is oral language put down on paper. Historically this is correct, but it is not absolutely essential that the reader master the letter-sound correspondence in order to be able to read. A deaf person who has

never heard a sound can still learn to read. The Chinese language has no correspondence between its oral and written forms; yet Chinese students learn to read. The deaf, however have much more difficulty learning to read than do hearing persons probably because of their lack of experience with the oral language.

The study of speech equivalents of printed symbols and their use in pronouncing printed and written words is called phonics. According to Carroll (1964) the sound-letter correspondence in English is more regular than irregular, contrary to the impression often given. He estimates that it is possible to develop a set of rules which would permit 95 percent accuracy in translating printed texts into corresponding sounds. The number of these rules and their complexity make it impractical to embody all of them in a procedure for teaching reading. Smith (1971), for example, estimates that it would take 166 rules to describe the spelling-sound correspondence of about 90 percent of 6000 one- and two-syllable words in the vocabularies of nine-year-old children (the pronunciation of ten percent of the words cannot be covered by a rule). Mature readers, nevertheless, behave as if they had acquired a large number of these rules.

For most people it is probably true that they first learn to read what they can say. As their sophistication in reading increases, however, they reach the stage where their reading vocabulary exceeds their spoken vocabulary and they are able to read many words which they are unable to pronounce. While a knowledge of phonics is not essential to learning to read, it can be very helpful when the student's spoken vocabulary is substantially larger than his reading vocabulary. By phonic analysis he is able to determine that the

word he sees is the same as the word he has heard and thus he knows the word's meaning. The usefulness of phonics as a method of increasing understanding disappears when the reader starts coping with words which are outside his spoken vocabulary. It seems obvious that even if he is able to pronounce the new word correctly he will be given no clues as to its meaning from phonic analysis. His strategies at this stage are to infer the meaning from the structure of the word or from the context in which it is used, or to look it up in the dictionary.

Knowledge of letter-sound correspondence is also very useful for translating written symbols into speech or speech sounds into writing. This permits the student to make a reasonable guess as to the correct pronunciation of an unknown written word or the correct spelling of an unknown spoken word. This latter skill is particularly important because it helps the student to locate the word in the dictionary. Use of a dictionary is obviously very difficult when the student is trying to learn the meaning of a word he cannot spell.

While sounding letters to unlock the meaning of a word is sometimes useful for a reader whose speaking vocabulary exceeds his written vocabulary, it is never part of the act of fluent reading. Not only do fluent readers not convert written words into sounds before they can comprehend writing, but it is generally impossible for them to do so -- fluent reading must be accomplished too fast for the translation into sounds to occur. When a reader stops to sound out a word, or for that matter to look it up in the dictionary, he loses the thread of meaning contained in the passage and will have to start reading for meaning again when he has determined the meaning of the word. Most of the time he will,

therefore, try to infer meaning from the context or from component parts of the word.

4. Rules of grammar

In both oral and written language there are common rules of word order and agreement between different parts of speech. In written language there are rules of punctuation and in oral language there are rules of inflection and pauses which are essential to meaning. Virtually all of the rules for oral language and the vast majority of the rules for written language are learned on the basis of experience without formal teaching and are applied automatically and instantaneously. Many competent readers become aware of the rules of grammar only when they study a foreign language. Readers seldom unlock the meaning of a sentence by applying a grammatical rule.

5. Inferring meaning from context

The skilled reader has to be able to ascertain the meaning of unknown words contained in the material he is reading. Sometimes he is able to determine the meaning from the context and to go on without interruption. There is almost always a great deal of redundancy in a communication element and the meaning of the sentence or paragraph often can be determined without knowing all the words. At other times it is essential that he determine the meaning of the unfamiliar word. The standard way for doing this is to look up the word in the dictionary. Experienced readers thus need to be able to infer meaning from context and need to know how to use a dictionary.

6. Structural analysis

Structural analysis means dividing a word visually into meaningful parts which can be recognized or attacked as subunits. This includes dividing words into prefixes,

roots, and suffixes, and separating compound words into components. Often, an unknown word is really a combination of known words or word-parts and the reader is able to determine its meaning by ascertaining the meaning of its components.

7. Reading for a purpose

A skilled reader needs to vary his reading speed and his approach depending upon his purpose. Sometimes he needs to skim in a search for major points; while, at other times, he needs to use the table of contents, the index, or section headings to search for particular types of information. When a reader's purpose is complete assimilation, he needs to read the entire text sequentially.

8. Sampling strategies

The skilled reader extracts information in an effective manner. Reading at this level usually involves the use of sampling strategies based on the reader's purpose and his knowledge of language. Using his knowledge of the language and of the context, the reader usually does not need to identify every printed unit (letter or word) in order to interpret the message.

Reading is an active process in which the reader forms and tests hypotheses about the information in the text, rather than passively reacting to written forms, unit-by-unit. The skilled reader has acquired strong response biases or guessing tendencies. Given a few cues, he will respond as though the entire word or perhaps an entire phrase has been presented.

9. Use of dictionaries and references

A skilled reader must be able to locate definitions of unknown words whose meaning cannot be inferred from context, phonic, or structural analysis. The dictionary is usually the most convenient source for such definitions, although use of other references or sources is sometimes desirable.

10. Automatic response

The skilled reader has to respond to graphic shapes, grammatical structure and context automatically and spontaneously, and to focus his attention on extracting meaning. The learning process must, therefore, involve a great deal of repetition until the elements of the reading skill become automatic -- what the psychologists call overlearning.

11. Speed of reading

A student who reads too slowly, perhaps slower than 200 words a minute, has difficulty determining the meaning of the passage because the burden on his memory becomes excessive. If he has to get enough visual information to identify every letter or even every word, he will not be able to read the passage for sense; the limitations of his memory system will defeat him. This need for sufficient reading speed so that all of the elements in a passage necessary to determine meaning can be kept in mind at the same time, is not limited to the poor reader. It is a common experience for all of us that when a passage is so difficult that we have to read it word-by-word we have to re-read it afterwards to acquire the actual meaning.

A distinction, therefore, has to be made between learning to read and proficient or fluent reading. The beginning reader has to learn to recognize letters and words to the point that the recognition becomes automatic and virtually instantaneous. Some of the special skills needed to do this will be of little use to him once he develops reading fluency. The more skilled a reader is the less visual information he needs from the page -- the more he is able to predict what the unread material will be. Skilled reading utilizes information from a variety of sources such as knowledge of the world and of language to reduce the need for visual information from the printed page.

A skilled reader does not require a fixed amount of information in order to identify a letter or a word. He can identify a word on more or less visual information depending on his access to information from other sources and on the information he demands in order to make a decision. He cannot afford to set his criterion too high for deciding on word or meaning identification; if he demands too much visual information, he will often be unable to get it fast enough to overcome memory limitations and read for sense. This readiness to take chances is a critical matter for beginning readers who may be forced to pay too high a price for making "errors."

Learning to read

If we were to look only at the conglomerate of research results in the general area of reading, we would be justified in concluding that learning to read is an infinitely complex task at which virtually everyone is ordained to fail. From our own experience, however, we know that, given even mediocre instruction, most of us somehow managed to muddle through. The ways in which people learn to read are discussed below.

There are three general approaches to learning skills, including the skill of reading. The first is to learn by doing: an attempt is made to perform the skill in a natural setting; feedback is obtained about degree of success; performance is modified as necessary; and a new effort is made to perform the skill. A second approach involves an analysis of the skill into specific required behaviors and then the practice of component behaviors -- one at a time, and, sometimes, in combination -- until mastery is achieved. A third approach, often combined with the second, is to develop a series of verbal rules to guide performance. These three approaches can be termed experiential learning, skill component learning, and verbal rule learning.

Experiential learning

Most of our learning is acquired through experience in the normal course of living without any particular conscious effort to learn and without any formal teaching. A normal child, for example, will learn to speak without being specifically taught. If he has frequent contact with other people who speak, it would, as a matter of fact, be difficult to keep him from learning to speak. Starting at an early age he acquires oral language slowly and in small steps by attempts to use it. He gets feedback from his environment on the degree of success which he has achieved. In this process he learns a number of skills: the recognition of sounds and how to reproduce them; the meaning of words; and the grammatical rules for putting words together into meaningful expressions. Even after he has become a fluent speaker he is usually not aware of how he learned the particular elements of speech or the rules which he is following. He could not, for example, describe the muscular activities required to make a particular sound nor could he give the rule governing a particular expression. If he is asked, he may be able to develop a rule by observing his own behavior; but it is apparent that awareness of specific rules seldom guides either his speaking behavior or the process of learning to speak.

When learning through experience the individual uses not only trial and error; but he also uses models found through the observation of successful performances by people around him. The opportunity to observe models of successful behavior, to try out behaviors which are appropriate to learning, and to receive effective feedback of results are all important to successful experiential learning. There is abundant evidence that individuals brought up in different types of environments learn very different things.

It follows that leanguage is learned better in an environment which provides for frequent contact with fluent speakers, positive reinforcements of speaking behaviors, and continual efforts to provide feedback on the effectiveness

of the child's communication. Parents who are themselves fluent speakers, who read to their children, who talk to them a great deal and answer their questions are likely to have children who master communications skills earlier than parents who do not have these qualities. One way to facilitate learning, therefore, is to structure the environment so that it facilitates the learning process. This can be done two ways: by enriching the quality of experience and by providing knowledge of the result of behavior in a way which can be used by the student to monitor his own behavior.

Skill-component learning

The learning of a complex skill through the mastery of its component skills is an approach that requires expert analysis of component skills. A tennis coach who directs the student to practice his serve, his back-hand, his approach to the net, and similar component skills of playing tennis is using this approach.

The skill-component approach is probably essential to the achievement of premier performance in any complicated task; but it is likely to be most effective for the highly motivated learner. A person who is strongly motivated to be an expert tennis player will be willing to practice his strokes by the hour. A person who has only minimal interest in tennis may have limited tolerance for the boredom of skill-practice. He may stay with the game longer, and thus learn more, if he learns primarily through playing.

The component skills required to be an effective reader are so numerous and complex that it is doubtful whether anyone has ever learned to read by practicing all the component skills and then putting them together into a total performance. As a matter of fact, because of the difficulty in isolating all of the skills, skill-oriented programs devote their major attention to a narrow range of skills (phonics, structural analysis, study skills) and largely ignore other critical skills which have been discussed above.

The skill-component approach is probably not effective as the principal strategy for the teaching of reading.

It should be useful, however, in coordination with other approaches, as an ancillary and supplementary strategy to remedy identified skill deficits and to provide an alternate approach for those students who are not learning through the regular program. It is also an effective technique for highly motivated students who want to work on their deficiencies.

Verbal rule learning

The skilled reader acts as though he has mastered a large number of rules, most of which he is unable to express in words. Mastery of a rule is defined here as the ability to apply the rule in practice but not necessarily the ability to state the rule in words. Tests of the unskilled reader in this area can be relied upon to identify a number of rules that he cannot apply. A plausible teaching strategy, therefore, is to teach the verbal description of needed rules to the underachieving reader as a way of helping him achieve reading mastery.

When used properly, the teaching of verbal rules can be a very effective learning strategy. It can, for example, be used as an intermediate step in learning a skill. The admonition "Keep you eye on the ball" helps the golfer acquire a proper orientation toward the ball and after he has mastered the skill, the rule is no longer needed. An easily remembered rule which has general applicability can likewise be useful. For example, the rule "'i' before 'e' except after 'c'" can serve as a guide to spelling words which have not been previously encountered.

As a strategy for gaining reading skill, the learning of verbal rules has the drawback that the mechanics of the reading act must be almost entirely automatic, since the reader must be able to use his conscious awareness to think about what he is reading. If he has to stop frequently to apply a rule, it will interfere with his ability to comprehend the written message. Other problems are that the memorization of verbal rules tends to be boring, and that students are able to memorize only a limited number of rules.

The use of verbal rule learning can be an effective teaching strategy if the teacher concentrates on important areas of skill deficiency, does not lose sight of the fact that the end product should be the automatic application of the rule rather than the verbal expression of it, and does not attempt to get the student to memorize very many rules. Perhaps the best approach is to teach the students in such a way that they discover the rules rather than memorize them. This process is similar to the experiential learning described above except that the learning situation is structured and the students are encouraged to verbalize the rules.

An important use of verbal rules is as a written resource to be consulted when problems arise. To be able to use such rules, the student does not need to memorize them, but needs only to know how to look them up.

Summary

The review of the evidence relating to how people learn to read leads to the conclusion that reading is learned primarily as a total act. The model provided by common experience in learning to read suggests that a basic strategy for the improvement of reading skills is to provide an environment that, ideally, can supply motivation, models, feedback, and practice. In an environment organized to facilitate the development of reading skills, the student should be assigned reading tasks at an appropriate level of difficulty, mastery should be required and specific, detailed and immediate feedback should be given to the student. Concurrently practice should be given in component skills in which the student is clearly weak. Verbal rules should be taught on a selective basis with a goal of achieving automatic application rather than verbal expression of the rule.

IV.

READING PROBLEMS

The typical underachieving reader in a manpower program has been in school a number of years but has not developed adequate reading skills. His reading skill deficiency can stem from a number of circumstances. The major causative condition of undeveloped reading skills, together with their implications for an effective remedial reading program, are discussed in this chapter.

Specific learning disability

It has been argued that a significant number of reading disabilities are caused by some sort of genetic brain dysfunction resulting in learning disabilities. These disabilities can be divided into general and specific disabilities. General brain dysfunction is similar to the concept of mental retardation. For the individual with general brain dysfunction, reading difficulties are part of a general pattern of difficulty in all aspects of living. Specific learning disability, or dyslexia as it is sometimes called, on the other hand, is considered to be limited to only a few tasks including reading; and in other aspects of his life the individual may be able to learn quite effectively.

Studies of brain function have shown that injuries to the brain can result in both general and specific loss of function and it is possible that genetic factors could limit the capacity of some individuals in their ability to master the reading task.

Most of the theorizing about specific learning disability comes from reading clinic practitioners who have been primarily concerned with non-reading children from literate families.

Relatively few children from literate families have difficulty mastering the reading task regardless of the method of instruction used. It is possible, therefore, that a high proportion of the poor readers among these students might have specific learning disabilities.

The picture is less clear when the individual with a reading problem comes from a lower class family, because the developmental environment provided by such a family often suggests many more possible causes of reading problems than a learning disability specific to reading. At the same time, the argument for specific learning disability as a cause of reading problems recognizes no class distinctions per se.

One application of the specific learning disability argument is that people differ in their preferred learning style or mode -- auditory, visual, or kinesthetic -- and an individual may fail to learn unless his preferred style is recognized. In such cases it is proposed that if an individual is having difficulty with one mode other modes should be attempted: that if the student is not progressing through materials employing a visual approach, for example, then auditory or kinesthetic approaches should be tried.

The difficulty with the specific learning disability approach, at the present time, is that there are no dependable diagnostic procedures for differentiating students with minimal brain dysfunction from students with delayed development resulting from sensory deprivation, cultural deprivation, motivational, or instructional factors. Further, it has not been found possible to predict which remedial strategy will work with which students. Even after a diagnosis has been made, successful teachers still have to rely on trial and error as the method for picking remedial strategies. If the student does not learn from one strategy the resourceful teacher tries another until he finds a method which appears to work for that particular student. Under these circumstances there is nothing to be gained by attempt-

ing to make a diagnosis of specific learning disability or dyslexia. Indeed, such an attempt might be costly since the student who is given such a diagnosis may feel degraded.

Visual disability

Since the reading task has obvious visual components, it seems reasonable to assume at least some reading problems may be related to disabilities in seeing or in perceiving visual information. Optometrists whose profession leads them to evaluate the effectiveness of visual performance, have advanced the theory that inability to perceive accurately is an important component of many reading disabilities. Intervention strategies of two types are proposed: (1) correction of optical defects, primarily through glasses, and (2) perceptual exercises.

The degree to which visual defects interfere with learning to read appears to depend upon the nature of the defect. Myopia and astigmatism apparently are not associated with reading difficulties while some other eye defects are. The myopic (near-sighted) eye has a posterior-anterior axis that is too long in relation to the focussing aparatus. As a consequence, the myope experiences difficulty when looking at distant objects (the blackboard, for example), because the image focusses in front of the retina. At near-point, however, myopia, if not too marked, is an asset, rather than a liability, to efficient reading. Since the slightly near-sighted eye requires less accomodative effort to maintain proper focal distance when book-reading, the viewer experiences little or no strain.[1]

The hyperopic (far-sighted) eye has a posterior-anterior axis that is too short in relation to the focussing aparatus. A small amount of far-sightedness is often conducive to eagle-eye vision at far-point. But the hyperope is likely to experience some difficulty at near-point (when book-read-

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[1]The discussion of visual disabilities is based on Schubert and Torgerson (1972).

ing, for example), because the image tends to focus behind the retina. This requires additional accomodative effort, which can be fatiguing. Research supports the contention that hyperopia is associated with reading difficulty.

Astigmatism is caused by unequal curvature of the surface of the cornea and/or the crystalline lens of the eye. The astigmatic individual experiences blurring because of these irregularities. Many researchers report an inability to differentiate groups of good and poor readers on the basis of astigmatism.

Aniseikonia is a condition in which the images of the two eyes differ in size or shape, making fusion difficult and often resulting in headaches and other manifestations of discomfort. It is believed that differences in size or shape of the retinal images exceeding five percent are serious.

Normal binocular vision is dependent on proper alignment of the eyes. Both eyes must be focussed accurately. When this occurs, the two retinal images, which are transmitted simultaneously to the vision center (occipital lobe), can be integrated into a single ocular image (fusion). Fusion problems vary in their degree of severity. Numerous research studies have indicated that there is a positive relationship between reading difficulties and fusion irregularities. Fusion difficulties can be caused by muscular imbalance, and, when fusion is not complete, the subject experiences blurred imagery, even though each eye achieves a clear image. Research indicates that muscular imbalance, along with far-sightedness, seems to be the eye defect most commonly found in poor readers. It should be noted, however, that, among good readers, there are individuals who suffer from exactly the same visual defects.

If the motivation of the student is strong enough, he will compensate for visual difficulties which make the reading task more difficult. If his motivation is poor the student may not be willing to make the effort necessary to

compensate for the visual disability. Even when the individual's visual difficulty is correctable with glasses, which make the reading task easier, he may not be willing to put up with the inconvenience of always carrying glasses with him. Children in this category often will break or lose their glasses and end up the way they were before with their eye conditions uncorrected.

Although there is no consensus as to the exact relationship between specific vision defects and reading problems, authorities agree that a thorough visual examination is an essential part of any attempt to remediate reading problems. To help insure the possibility of children achieving their maximal efficiency in reading, it would seem wise to correct visual anomalies.

All commonly used screening tests for vision problems have shortcomings. The familiar Snellen chart, for example, checks vision only at far-point and fails completely to detect severe cases of poor fusion and muscular imbalance. It also fails to detect most cases of astigmatism and far-sightedness. Near-sightedness is the only defect adequately screened by the Snellen chart, and this defect, ironically, is the one most often associated with good reading and good scholarship.

Many optometrists also recommend perceptual exercises to improve the visual performance of poor readers. It seems a reasonable proposition that ability to perceive accurately will be associated with success in acquiring reading skills; but, in our review of the literature, we were unable to find evidence that formal perceptual exercises have been developed that demonstrably improve perceptual ability.

The main point about the visual aspect of reading is not that a reader requires a special kind or degree of acuity to discriminate between two letters. The reader's problem is to discover the critical differences between the two letters which is not so much a matter of knowing how to look as of knowing what to look for. Such knowledge is discovered by the reader for himself by means of perceptual

and cognitive skills common to many aspects of visual perception.

Auditory disability

Auditory defects can relate to the inability to hear sounds or the inability to differentiate sounds. The first type of defect is called a hearing loss and results in difficulty in acquiring oral language. Since mastery of oral language facilitates learning to read, individuals with hearing losses of sufficient severity to interfere with oral communications are likely to be slowed down significantly in their efforts to learn to read. Such students should be referred to programs equipped to handle the reading problems of the deaf.

Some people can hear the sound but have great difficulty discriminating between sounds that are similar. The causes of this disability might be either genetic or cultural. Genetic inability to discern small differences between sounds would be classified as a specific learning disability and has been discussed above. Cultural causation relates to the type of speaking community in which the individual learned oral language. All communities do not use the same sounds as component parts of their oral language system. The normal child initially has the capacity to produce all of the sounds that are used by human speaking communities. As he learns the particular language of his community he learns to discriminate among the sounds that are important to the particular language or dialect spoken by the people around him. The learning of these distinctions appears to be easiest prior to the age of about eight and becomes steadily more difficult as the individual becomes older. Some older people learning a new language are never able to reproduce the sounds in the new language which are different from the sounds in their native language. They probably are also limited in their capacity to differentiate among these sounds. Remediation of these deficiencies often turns out to be an extremely difficult task.

Inability to differentiate between sounds reduces the amount of information given to the reader but may not seriously handicap him in determining the meaning of the word. A skilled reader interpretes words in context and is often not confused by words which sound or are spelled alike but have different meanings. For example, the word "form" can be both a noun and a verb and has at least fourteen meanings: "form" might mean the shape of something, a document to be completed, or a grade in school. Readers encountering this word usually do not have difficulty determining its meaning when it is used in a particular context.

Remedial programs to improve auditory discrimination may not be worth the time and effort if the primary concern is to improve reading skills. Such programs are more likely to be justified as an effort to improve the oral language of the student so that he is better understood by others or better able to meet occupational standards for speaking competence.

Linguistically impoverished background

It has already been noted that deaf children have more difficulty learning to read than do hearing children because they have not had the same experience with oral language. Other limitations on language experience can also retard language development. Hunt (1969) maintains that parents in poverty typically talk less often to their children than do parents of the middle class. Lower class parents themselves often have failed to utilize prepositional relationships with precision and to talk of topics demanding abstract concepts. Moreover, their syntax differs substantially from that of the standard language of the mainstream of society. Thus, they serve as poor linguistic models for their young children. Furthermore, these parents seldom ask questions that prompt their children to note the various perceptual characteristics of objects, to attend to the various relationships among them, and to respond with language describing these characteristics and relationships. On the contrary,

when these children ask questions, their parents all to often tell them to "shut up" without giving a reason.

Many writers share Hunt's view of the adverse effect of poverty on language development. Other writers say that these effects are exaggerated and that lower class language and culture, while different, are not inferior to that of the middle class. The resolution of this conflict need not be of direct concern to the teacher. The present skill level of the student, rather than the diagnosis of causes for underachievement, should be the focus of attempted remediation.

Lack of confidence in ability to learn

The poor reader may have experienced failure at an early stage and developed doubts about his ability to learn to read. Reading deficiencies inevitably lead to academic failure. Low self-esteem may develop and this can lead to a host of other problems.

A number of studies have shown a high incidence of emotional problems among poor readers. Introversion, lack of self-confidence, shyness, fear of reading, over-dependence upon approval, withdrawal, truancy, tenseness and obnoxious behavior are found frequently among individuals with poor reading ability.

Individuals who experience failures develop defensive mechanisms to bolster their egos. They seek out individuals who are like themselves and develop rationalizations in conjunction with their peers for their current situation. Frequently values become inverted. What was initially a source of assumed inadequacy becomes converted into a desired set of objectives. Intellectual and academic achievements become derided and are considered undesirable. Other goals which can become achieved are given values in their place.

The teacher often has a difficult problem in dealing with the effects of low self-esteem and feelings of failure and their accompanying defense mechanisms and personality problems. Possible strategies which might be used by the teacher are discussed in a later section.

V.

PROPOSED REMEDIAL STRATEGIES

A number of ways to deal with the educational problems of persons with deficient reading and arithmetic skills have been proposed. These approaches have frequently been proposed as unique "solutions" to the problems of remedial education, and they often take on some of the characteristics of a cult or a fad. In selecting approaches for discussion in this manual, primary consideration has been given to strategies possessing theoretical positions implemented by curriculum materials which have been found to produce results in real life situations. In the following discussion each approach will be described and its strengths and weaknesses evaluated.

Contingency Management

Contingency Management is the purposeful application of operant conditioning principles to achieve desired behaviors. Operant conditioning is based on the principle that behavior is maintained by its consequences. The likelihood of our displaying any given behavior is constantly being changed by the environmental consequences that follow the behavior. Behavior that "works" is more likely to be repeated. Behavior that does not "work" is not so likely to be repeated.

Contingency Management involves the manipulation of the learning environment so that desired learning behavior is fostered. The trick is to arrange environmental consequences in such a way as to increase the frequency of desired behavior and to decrease the frequency of the unde-

sired behavior. There are two types of consequences--those that increase the probability that the behavior will occur in the future (reinforcement), and those which make it less likely that the behavior will occur (non-reinforcement or inhibition). These two types of consequences are discussed below.

Reinforcement can be either positive (pleasant consequences associated with desired behavior) or negative (unpleasant consequences that cease with desired behavior). The desired behavior of hanging up clothing, for example, could be positively reinforced by praise when the clothes are hung up, and negatively reinforced by nagging which ceases when the clothes are hung up. Whether positive or negative, reinforcement is focused on desired behavior.

Behaviors will tend to decrease in frequency when they are not reinforced or when they are inhibited by consequences that decrease the probability of their recurrence. If a behavior is ineffective or leads to an undesired result, we tend to discontinue it or to try something else.

The three key principles of Contingency Management are : (1) to arrange the situation so that the probability of desired behavior occuring is maximized; (2) to provide positive reinforcement for the desired behavior when it does occur; and (3) to take great care to avoid reinforcing undesired behavior.

Negative reinforcement and inhibition are avoided whenever possible because of the difficulty in predicting their effects. While both positive reinforcement and negative

reinforcement can be used to increase the occurrance of the behavior, positive reinforcement is the more reliable procedure since the effects are likely to be limited to the behavior which is being reinforced. The effects of negative reinforcements are not as predictable because any behavior which ends the unpleasant stimulus is strengthened. A child who is being nagged to do something may end the nagging by a number of strategies other than doing the thing he is being nagged to do. He may escape the situation either physically or psychologically or he may make things so unpleasant for the nagger that the nagging stops before the child provides the desired behavior. While the use of an inhibiting consequence often tends to extinguish a behavior, inhibitive contingencies frequently result in undesirable side effects. Excessive inhibition leads to the emotional responses of fear, anger, and a desire to outwit or repay the person who administers the inhibition. The teacher is advised to attempt first to non-reinforce the undesired behavior while strongly and positively reinforcing the opposite, desired behavior. If the undesired behavior is so disruptive that it cannot be ignored or is a strongly established habitual behavior, it may then be necessary to use inhibition to weaken the undesired behavior.

For an operant conditioning strategy to work it is essential that the selection of reinforcers and inhibitors be individualized. Praise from a person in a place of authority for example might serve as a potent positive reinforcement for one individual, be of no consequence (a neutral stimulus or event) for a second and be a negative reinforcer for a third. Common sense, experience, and the individual subjects themselves aid in the identification of potential reinforcers and inhibitors. Whether or not these potential reinforcers are actual reinforcers can be determined by observed changes in behavior which occur as a function of their utilization in particular situations.

When the desired behavior does not occur it cannot be positively reinforced. This has been called the problem of the first instance. First instance problems may be approached by considering why the behavior is absent: is it because the student does not know how to engage in the desired behavior or is it because he does not want to engage in it? If the student does not know how, the situation requires teaching him how to perform the desired behavior. If the student knows how but does not want to perform the desired behavior, the problem may be resolved by providing him with a suitable incentive so that he will want to perform the behavior.

When the student does not have the desired behavior within his behavioral repertoire a process called "shaping" or the method of "successive approximations" is employed. The student needs to begin from a level at which he can presently function; and in order to get the process started, it is essential that some aspect, simplified form, or approximation of the desired performance which is within the ability of the student be identified. Shaping is the building of larger and more complex units from the initial starting point: it is a stairway of behavioral steps, each of which is small enough so that the movement continues without stumbling or faltering; yet large enough so that the various behavioral objectives are reached as repidly as possible. Successful performance at each step is then positively reinforced and the student advances by small successive steps to the performance of the desired behavior.

When the student is able but not motivated to perform the desired behavior, the reinforcement associated with the behavior needs to be changed. The teacher needs to analyze the reinforcements the student may be receiving from not performing the behavior and to change the circumstances so that these reinforcements are not received. The teacher may also need to experiment with new incentives.

A useful distinction can now be made between two types of incentives-- intrinsic, and extrinsic-- both of which can result in positive reinforcement when they follow the performance of a behavior. An intrinsic incentive occurs when an individual receives knowledge that his behavior is effective in advancing him toward achieving a larger goal. In the case of reading an intrinsic incentive would be knowledge that he had increased his reading skills. An extrinsic incentive, on the other hand, is the receipt of something of value in return for the desired behavior.

Although extrinsic incentives may be useful, particularly in the early part of the student's program experience, their operant power tends to diminish with time; for solid advancement toward the learning goals that Contingency Management is designed to achieve, intrinsic incentives are more powerful than external rewards. In using extrinsic incentives, therefore, the teacher should recognize that they should be replaced as soon as possible by intrinsic incentives. One of the most important skills of the teacher is the ability to shift the reinforcement from extrinsic to intrinsic incentives and to develop the student to the stage where he is primarily motivated by the knowledge of the results of his performance.

The emphasis on achieving success is often a useful technique in the shift from external to internal incentives. Students with low self-esteem and long experience of failure need to have frequent success experiences in the academic setting if their motivation to make an effort to learn to read is to continue. This suggests the need to structure the reading task so that short-term goals and objectives are highlighted. The experience of achieving success in small units is a very positive motivator. Many students lose interest solely due to the large scale of the traditional school assignment. This aspect of Contingency Management is primarily an engineering problem, in which the curriculum is developed so as to maximize the positive reinforcements which are possible. Positive reinforcements can also be increased by the way in which the teacher recognizes progress.

Operant conditioning experiments have shown that the reinforcement schedule-- whether reinforcement is continuous or intermittent--influences the lasting effectiveness of reinforcement. Continuous reinforcement, or reinforcement whenever desired behavior occurs, probably maximizes immediate effects; but when such reinforcement is discontinued, the desired behavior may lapse. The probability of lastingly modified behavior is increased if intermittent reinforcement is used. It follows that unless the reinforcement schedule is carefully thinned and randomized, the new behavior will weaken after the student leaves the behavior change program. Reduction in the frequency of reinforcement should begin as soon as the teacher notes that the performance rate is acceptably high and a stable rate of performance is being produced.

Although the principles of Contingency Management, as well as results achieved through the application of these principles, hold considerable promise for remedial education programs, proponents of Contingency Management sometimes exaggerate the contribution that it can make to the learning process. Applications of Contingency Management principles, furthermore, are often premature in the sense that they are installed in classrooms before the necessary engineering of the system has been completed. In our review of ongoing educational programs we found a number of instances in which Contingency Management principles had been introduced into a program and spectacular successes were reported during the first few months of the application. An investigation several years later showed in each case that the program had failed to maintain its initial progress and had been discontinued. These programs typically used money, or tokens, or free time as incentives. The students were permitted to earn points on the basis of academic or behavioral achievements and could convert these points to either money or tokens. The tokens could be converted into free time, prizes of various sorts, or perhaps money. In our view, these programs broke down because they became too difficult to admin-

ister and the incentive value of the reinforcements tended to diminish. Two things seemed to happen. First the students became very concerned about the fairness with which the points were issued which resulted in a great increase in the record keeping requirements and the need to adjudicate disputes. Both the record keeping needs and the time spent in adjudicating disputes became a heavy burden to the program. The second problem was that students soon tried to beat the system and to gain points without earning them. To the degree that the efforts to beat the system were successful this increased the concern of the other students that the points were being issued fairly. The vigilance of the teachers had to be increased to prevent cheating and the time spent on complaints also increased. At the present stage of development, programs based on tokens -- money, or other tangible rewards -- are probably not worth the effort and cause more difficulties than they achieve in improved performance.

Operant conditioning principles can be used very effectively in curriculum planning. The notion that a curriculum should start at the point where the student can achieve success and then move by small sequential steps to a skilled performance is a powerful idea which provides one of the theoretical bases for programmed instruction. In the development of the program described in this manual, extensive use has been made of this principle. Teachers who are trained in behavioral modification techniques have effective tools for increasing the motivation of students and for guiding their performance. It is difficult to apply these principles in practical situations. It is generally necessary to develop individual prescriptions for each student rather than to have general practices which can be applied to all members of the class in the same way.

Although these are very useful teaching tools, their effectiveness generally depends on an individualized approach engineered to fit differing student needs. Contingency Management, in other words, requires a great deal of skill and time from the teacher.

Programmed instruction

Programmed instruction is a technique for teaching which is applicable to many types of learning situations. It permits self-instruction through a step-by-step presentation of information with each step immediately followed by tests. The objective is to motivate the student to work on his own, and to improve the effectiveness of the learning process by more active student involvement and immediate feedback of results. The essential characteristics of the approach are: (1) the subject matter is divided into easily comprehended steps; (2) the questions have a small error rate--that is, the students can usually answer them correctly so that he learns by success rather than failure; (3) the material is in graduated form with easier material at the beginning and more difficult material later on when the student can absorb it best: (4) the student is required to involve himself fully and actively in the learning process through self-testing at each step: (5) the learner is informed of his strengths and weaknesses as he goes along; and (6) the learner is given a chance to proceed under his own steam and at his own pace.

Programmed instruction has a number of obvious advantages for participants in manpower programs. Individualized instruction and flexible scheduling are greatly facilitated if students can work by themselves at their own pace. The teacher can then deal with some students individually or in small groups while the other students are busy on their programmed assignments. Since everyone in the class is not necessarily doing the same thing, students can enter at any time without disrupting the class or being so far behind the rest of the class that they are unable to understand the material being presented in a class session. Programmed instruction also permits focussed assignments and individual prescriptions. The teacher can determine the specific needs of the student and match these against a particular set of materials which respond to the student's needs. Thus, to the

degree that the curriculum has been programmed into useful modules, the teacher is in a much better position to individualize instruction and to deal with the particular needs of the student.

The major drawback to programmed instruction is that it can be excessively dull. Most students in a manpower program can be expected to need a lot of social reinforcement and encouragement; and their needs in this respect may be even greater when the program involves programmed instruction. The question posed by programmed instruction is, therefore, how can the advantages and efficiencies of programmed instruction be utilized without being offset by disadvantages of boredom and inefficiencies in the time and effort required to overcome the boredom? The combination of individual programmed instruction with group methods of teaching, use of tutors, use of games, and techniques for having students cooperate in pairs or in small groups in completing the programmed materials are ways of dealing with this problem, which are discussed later in this manual.

Component skill approach

An approach often recommended for the teaching of complex subjects, such as reading, is the teaching of simpler component skills. As applied to reading, this approach involves initial testing of component skills, diagnosis of component skill weakness, and remedial attention directed toward the improvement of deficient skills. This approach assumes that the final act of reading is based on the composite of component skills which can be added together to provide the finished performance. Sometimes these skills are considered to be hierarchical in nature with mastery of one skill required before the skill next higher in the hierarchy can be mastered. Frequently discussed skill areas are: (1) sound-letter correspondence; (2) word attack skills; (3) structural analysis; (4) inferring meaning from context; (5) skill in use of grammar; and (6) skill in the use of the dictionary and other resources.

in his efforts to learn to read. He may have become convinced that he does not have the ability to learn to read and if he is asked to read for comprehension he may have built up so many negative attitudes toward the reading task that he will not work productively even though the level of the material is within his competence. The component skill approach to reading may be useful for students with such backgrounds in several ways. First, sometimes such students may be willing to attempt to work on a component skill because it is less threatening to them then to attempt the entire reading task. When they have experienced sufficient success with completing component skill exercises they can then be introduced gradually into the graded reading program. Secondly, the component skill approach can add a change of pace and variety into the reading program. Finally, weaknesses in component skills can be expected to make the reading task more difficult for the student. Even though all the component skills of reading have not been identified it makes sense to work on the weaknesses which can be pinpointed.

We have concluded from the above analysis that the component skill approach should be a supplementary, rather than a primary, teaching strategy. Its inclusion in an education program provides the capacity for a change of pace and an alternate teaching strategy. If a teacher finds that a student does not do well in graded reading but will concentrate on component skill exercises the teacher should consider assigning the student for a greater proportion of his time to component skill exercises in an effort to build up his confidence in his ability to master the reading task. When this goal has been achieved, the student should be returned to graded reading assignments supplemented by skill practice exercises.

Hooked on books

This approach was popularized by Fader (1969) and has been proposed as an effective way for getting even the most bored and apathetic student to enjoy reading. It is based

on the assumption that the reason that most people are poor readers is that they have never learned the advantages and satisfactions which can be obtained from reading. The idea is to surround the student with newspapers, magazines, and paper bound books so that he comes to perceive them as pleasurable means to necessary ends. After these materials have been made easily available, the primary teaching strategy is to get the students involved in the reading act. The student then learns for himself that reading can be fun. After he has made this discovery, it is expected that he will continue reading by himself outside of the classroom.

The idea behind the "hooked on books" approach is basically sound. The student needs to be convinced that reading is a worthwhile activity in which he can participate. It is very unlikely, however, that--by itself--it will stimulate a young adult who has serious reading difficulties to learn to overcome these difficulties. With a young child who has not experienced reading failure, it may be enough to help him appreciate the satisfactions that can be obtained from reading and to give him assistance as he needs and asks for it. The young adult, however, is likely to be past the period when the acquisition of the reading skills comes easily. There are likely to be many reasons why he has not learned to read at an earlier date. The "hooked on books" approach may help to stimulate his motivation to make the effort to learn to read; but, to achieve substantial progress, it probably will be necessary in most situations to use systematic teaching methods which are tailored to the specific needs of the student.

While the "hooked on books" approach cannot be regarded as a universal panacea it can be used effectively for two purposes. First it can stimulate motivation when the student enters the program; and, second, it can provide for continous opportunity for recreational reading on topics and at a reading level satisfactory to the student. The teacher should constantly attempt to stimulate the student to engage in

recreational reading in order to increase the exposure of the student to the reading task and thus to increase the amount that the student learns through experiential learning. Emphasis on recreational reading is relatively inexpensive in materials and teaching time, and does not need to conflict with other parts of the reading program.

Language experience approach

People who are able to hear almost always learn oral language before they learn to read. In the early stages of learning to read, they are learning the written equivalent for words and ideas which they are already able to express orally. The language experience method attempts to capitalize on this fact. The teacher, in cooperation with the student, identifies words that the student already has in his oral vocabulary. One way to do this might be to get the student to tell a story. The teacher writes down the words used in the story and then teaches the student to read these words. Since they are words which are both of interest to the student and already contained within his oral vocabulary, he finds the reading task much easier and more interesting than if he were attempting to learn words which he either did not know or did not typically use.

The language experience method can be very effective for those poor readers who can speak many more words than they can read. The personal attention that is involved in this approach can increase their motivation, and it can give them a sense of achievement as they master the reading of words which they can already speak.

The drawbacks to the method are that it is expensive in the use of teacher time and it does not carry the student beyond his speaking vocabulary. Because of these limitations it should be used as a supplementary strategy for students who are not learning through the normal curriculum and whose oral vocabulary significantly exceeds their reading vocabulary.

Educational games

Educational games have been proposed as a strategy for teaching reading and mathematics. The following arguments

are made for using games for this purpose:

1. Because they can be fun, games can motivate a student to engage in an activity in which he must use knowledge or skill relevant to the teaching goal

2. Games provide immediate feedback of results, an important element in the learning process

3. Because of their repetitive nature, games are a good way to provide sufficient practice in a skill to make it automatic

4. Games can be used to supplement programmed instruction to provide social interaction and a change in pace.

We have concluded that games can be an important element in an educational program if they are geared to the needs of the student. The teacher should have available as a resource games at all levels of difficulty, and should use them in a planned way in order to intrigue the student with an aspect of the learning task. Guidelines for the use of games are discussed later in this manual.

Multi-sensory approach

It has been noted that students vary in their preferred learning styles and that some learn better through visual methods, some, through auditory methods, and still others, through kinesthetic methods. There is no best method per se. Only when a corrective program is based on individual needs can any method be cited as superior. It is evident that if a student suffers from auditory or visual deficiencies it is wise to choose a method of instruction that minimizes the handicap as much as possible. Since it is not possible to tell which method will work best in an individual case, the teacher must be flexible and versatile and must be prepared to use alternate strategies when the initial teaching strategy does not appear to work.

The concept of preferred learning style is closely associated with the idea of minimal brain dysfunction which was discussed earlier in this paper. This problem appears to occur quite frequently among middle class academic under-

achievers who have a family background which usually is associated with easy acquisition of reading skills. For students coming from backgrounds which do not facilitate the mastery of reading, the proportion of students with this type of problem is likely to be very much smaller. It is, nevertheless desirable, that teaching strategies be available when such problems do occur and a student is not learning through the regular teaching methods. The multi-sensory approach in which information is provided through a combination of visual, auditory, and kinesthetic means has reported to be dramatically successful for some types of students. The disadvantage of this method is that it is very expensive in terms of teacher time. Guidelines for using this approach are provided later in this manual.

Instructional hardware

During the last few years the use of various kinds of mechanical and electronic devices have been proposed as aides to the teaching of basic academic skills. These devices include tape recorders, film projectors, or even computers. Our survey failed to locate a single program which had been consistently using such hardware over a reasonably long period of time. A number of programs had purchased various types of instructional hardware but were not using them. These results are similar to those reported by Systems Development Corporation in their survey of job-related adult basic education programs except that they did find one project with instructional hardware being used by students at the time of the survey.

At the present time it is our opinion that hardware is not an essential part of a basic education program. There may be situations, however, in which hardware can be used productively. When it is selected carefully for easy teacher and student use it can be a valuable source of variety and increased motivation. Some hardware can also give immediate feedback of results. Computer-assisted programs fall in this category and could in the future be an

important component of educational programs. At the present time, such programs are too expensive to justify their use in the relatively small educational programs that are likely to be needed for manpower programs. For the most part hardware should be considered as a refinement rather than as a basic part of the program. In many cases it will be better to spend the money for other purposes.

Tutors

An attractive idea which has been frequently tried is to arrange tutorial assistance for academic underachievers. The tutor may be an adult who volunteers his or her services or a more advanced student. The attraction of the tutorial approach is that tutors can give the student far more individualized attention than can the teacher. Since academic underachievers need as much attention as they can get the tutorial approach--providing the tutors are sympathetic and conscientious--would seem to be particularly appropriate for remedial education programs.

In our review of ongoing programs, we found that the major problem with tutorial programs was keeping the tutors. A typical pattern was that one or two committed tutors would be of great assistance during the initial phases of the program. Frequently these individuals would eventually lose interest, or leave the program for other reasons, and replacements were unavailable. For this reason most of the tutorial programs that we observed were discontinued.

It is our recommendation that program administrators not depend upon outside tutors as a regular part of their educational programs unless there are special circumstances which increase the likelihood that the tutors will continue to come. Some government agencies and private companies give released time to employees who serve as tutors. Such tutors can be expected to stay with the program longer than tutors who are volunteering their free time. There may be other circumstances which make it more likely that the tutoring commitment will be met over a long period of time,

but it should be always kept in mind that the program will suffer if its design calls for tutoring and no tutors are available.

In most situations the use of other students as tutors provides better prospects for dependability than does the use of outside tutors. One possible approach is to use "older" (more experienced in the program) students to tutor new students. The assignment of the tutorial task to the older student can serve a double education function: for the older student the assignment can be evidence that he has progressed to the point that he can be used as a "teacher;" and, for the new student, the extra attention may be important to getting him started in the education program. Tutoring by students is not likely to be successful without a carefully structured program of activities based upon explicit instruction that can be read by the student tutor. Without this essential ingredient the program tends to become disorganized and inefficient, and is therefore likely to fail. A discussion of guidelines for the tutoring approach is contained in a later section of this manual.

Peer-mediated instruction

Peer-mediated instruction (PMI), developed by Rosenbaum (1972), is a relatively inexpensive way of providing students with practice in skill performance. It is based on the following principles:

1. Students learn at varying rates
2. Students can benefit from immediate and selective feedback on the adequacy of their performance
3. Students can benefit from tailored assignments based upon demonstrated need
4. Students will learn more capably if required to demonstrate acquired proficiency in one component of the curriculum before proceeding to the next.

Peer-mediated instruction directs students to do their work in pairs, interacting with one another according to a structured pattern of dialogue that insures for both members

of the pair a successful learning experience. One member of the pair is a student for half of the time while the other is the teacher. They then change roles and the student becomes the teacher and the teacher, the student. The student works on a structured assignment geared to his level of need. The "teacher" has the answers to the exercises in front of him and feeds back to the student the answers to the exercises so that the student knows whether he made a correct or an incorrect response.

There are several potential advantages in the PMI system. In the first place, it provides for social interaction and cooperation in a learning task. These features can be particularly important in an individualized program in which most of the assignments must be completed by the student on his own. The PMI approach also shows the student that information about results can be used for learning and does not necessarily serve as an evaluation of his worth.

PMI produces more immediate feedback of results than is usually possible when instruction is provided by teachers or teacher aides. In the PMI approach, each member of the class is receiving feedback on his activities for half of the time. During the other half of the time, when he is providing the feedback to the other student, his involvement in the learning task should enhance his own learning performance.

Finally, since this system can be self-directing, it can free the time of the teacher for more individualized assistance.

The principal drawback of PMI is that it is useful only for curriculum elements which can be structured into short, specific exercises. With respect to the reading task this limits the exercises to vocabulary, spelling, and word attack skills. The system also appears to suffer from the disadvantage that the students tend to tire of it after about eight weeks. For the individual student, PMI is a short-term, rather than a continuing, strategy.

We have concluded that the peer-mediated instruction can be a powerful learning strategy when used to initiate students into a learning program. It can also be used as a change of pace in order to add variety to the program. Guidelines for its use are contained in a later section of this manual.

English as a second language

It has been suggested that the reading and writing problems of students from minority groups stem from the fact that the language they have learned differs significantly from standard English. For such students it is proposed that an effective remedial strategy would involve designing text books and curricula that reflect the speaking patterns of the students' sub-culture. The idea is that the student should learn to read in his own dialect and then later to learn to read English as he would learn to read a foreign language.

Our review of the literature and of on-going programs did not uncover evidence that introducing the additional step of training the student in non-standard English results in any reduction in the time it takes him to master standard English. Non-standard speakers are usually exposed to standard English through television, radio and contacts with persons outside of their home community; and, while they may have difficulty speaking standard English, they can usually understand it. Support for this conclusion is provided by a study of black English, (Melmed, 1970). In this study, pairs of words were selected which are different in standard English but are homonyms in black English. Black subjects had difficulty auditorially discriminating among these word pairs and read them orally as homonyms. While reading these words orally or silently in context, however, the subjects showed no inability in comprehension.

The potential problems created by the discrepancies between standard and non-standard English should be of continual concern to the teacher. Differences in speech

forms between standard English and the language used by the student from a linguistic sub-culture can create communication problems or misunderstandings. The teacher of such students should understand their language so that he is able to understand what they say. He should also be very careful to assure that the student does not feel inferior because his speech patterns differ from those of standard English. Particularly in the beginning of the educational program, the teacher must be most careful about correcting the student when he uses non-standard forms in order to avoid making the student feel that the correction is a personal criticism. On the other hand, if the teacher understands the non-standard speech patterns sufficiently well to be able to communicate with the students and if the teacher is careful to give respect to the alternate methods of speaking, the teacher probably should be able to use standard methods for teaching reading and writing. It should be always kept in mind that the learning goal of language education is competence in standard English.

Job-related education

It is often argued that the establishment of a close connection between a student's education and his vocational goal will increase the student's motivation to succeed in his education. Because of better motivation, job-related education programs, therefore, are more effective than other education programs. We were unable to identify any programs which, over a long period of time, had been able to gear education to the jobs which were likely to be obtained by the students. Perhaps the reason for this is that most of the students did not have occupational goals that were specific enough to suggest changes in the educational curriculum.

It was our conclusion that the educational program should be geared as much as possible to the job interests of the student. If the student has an interest in a particular job, for example, reading selections or vocabulary appropriate to that job should be incorporated in the educa-

tional program for that student. The teacher should not, however, limit himself to job interests but should be sensitive to any other interests which are likely to have motivating value for the student.

College oriented programs

It has been proposed that placing an education program in a college environment will improve the effectiveness of the program; because students can take pride in the fact that they are in a college community, and they can take advantage of the opportunities and resources in such a setting. Two widely publicized programs of this type are NYC Goes to College and the College Adapter Program.

A longitudinal study of out-of-school Neighborhood Youth Corps Programs raised serious questions as to whether such programs do in fact have an impact on the educational achievements of academic underachievers. There was no evidence from this study that students participating in programs on college campuses advanced their academic skills more than students participating in non-college based programs. None of these students entered a college program which led to a career that required college preparation.

We have therefore concluded that academic underachievers do not learn better on college campuses than in other settings and that there is very little if anything to be gained by placing manpower educational programs on college campuses.

VI.

THE MATHEMATICS UNIT

Much of the material in the preceding sections of this manual applies to all units--reading, mathematics, and advanced general education--of an education program. Up to this point, however, our discussion has tended to focus on the reading unit, because of the overriding importance of reading skills and because of the controversial difficulties that abound in the field of reading instruction. Compared to the teaching of reading, the teaching of mathematics appears to be a field with fewer controversies and with general agreement as to approach--at least in the lower skill levels.

In this connection, it is useful to make a distinction between mathematics and arithmetic. The dictionary definition of mathematics, the more general term, is "the science of numbers and their operations, interrelations, combinations, generalizations, and abstractions and of space configurations and their structure, measurement, transformations, and generalizations." Arithmetic, a branch of mathematics, deals with real numbers and their computation. The skills required to master arithmetic can be quite different from those required to master mathematics. The distinctive characteristic of numbers in arithmetic is that they represent concrete entities while the numbers in mathematics may involve more abstract concepts.

In this manual we are primarily concerned with improving the computational skills of the student and providing him with a sufficient background in algebra and geometry to enable him to pass the GED examination. We are not concerned with preparing him for advanced mathematics courses and,

therefore, training in abstract reasoning is not an important goal of the program.

The skills involved in mathematical operations can be precisely identified and arranged in hierarchical order: the mastery of skill at one level is an essential prerequisite to achieving mastery at the next higher skill level. Providing the student is adequately motivated, the teaching of mathematical computations can be done best by programmed instruction. In contrast to the teaching of reading skills, diagnostic prescriptive teaching becomes a realistic possibility in the teaching of mathematics and the major remaining problem is one of motivation.

The discussion of various motivational strategies is equally applicable to reading and mathematical computations and will not be repeated here. Games are, perhaps, of greater importance to the teaching of mathematics both because the programmed instruction is probably duller than it is in reading and because it is possible to design games which come close to actual mathematical operations.

VII.

THE ADVANCED GENERAL EDUCATION UNIT

The scope of the purpose of the education program discussed in this manual extends to the preparation of students so that they can pass the GED examination. The Advanced General Education unit provides this preparation. Before entering this advanced unit, the student will have reading skills that will enable him to handle the materials.

Although some students may enter the program with reading skill levels high enough for the advanced unit, many will have gained their prerequisite reading skill by completing the program's graded reading unit. In either case, the advanced unit will provide not only the means to master subject matter for the GED examination, but also reading practice that should increase the student's reading fluency and his reading interpretation skills.

Most of the GED content areas do not require prerequisite skills in mathematics; and a student might enter the advanced unit before completing the Basic Mathematics unit. Before he is ready to take the GED examination, however, he must complete both the Basic Mathematics Unit and the mathematics portion of the AGE curriculum.

By the time the student enters the AGE unit it can be expected that he will be better motivated and more capable of working on his own than the students in the Reading and Basic Mathematics units. The general principles of motivation and classroom management apply here as well as to the Reading and Basic Mathematics units.

VIII.

PRINCIPLES AND APPLICATIONS

Those charged with the conduct of a remedial education program should be sensitive to the personal characteristics of students in the program as well as to their needs for education. Some characteristics are intimately related to education needs in that they stem from them (or were caused by the same situation that produced the needs) and often constrain the operation of remedial approaches. Students in remedial education programs are likely to have one or more of the following characteristics:

1. A history of failure. Repeated failures in school and society usually have left the student with a defeatist attitude and an extreme need for motivation to learn.

2. A negative attitude toward school. This student typically has been unable to meet the demands of conventional schooling in the past and he dislikes anything that reminds him of his school experience.

3. Immaturity. The inability to start and finish tasks, the failure to assume personal responsibility, and a sense of insecurity are characteristics that must be modified if the student is to make satisfactory progress.

4. Dependency. Past failures may have led the student to place a low value on his worth as an individual. This, in turn, tends to make him seek sources of strength in other persons.

5. Suspiciousness. Past life experiences have often made the student distrust even well-intended overtures on the part of others.

6. Short attention span. These students typically are easily distracted and have developed bad study habits.

7. A low tolerance for frustration. These students are easily frustrated and frequently overreact to frustrating situations either through aggressive behavior or through withdrawal.

With few exceptions the teenage students can be expected to have been exposed to eight to ten years of schooling. Most of these younger students will have acquired some reading skill, but their reading will probably be weak in at least one component-skill area. The areas of reading strength and weakness can be expected to vary extensively so that individualized instruction is usually essential.

When a student first enters the program, he is likely to have some hope that he can improve his education. But his attitude toward education is often complex. On the one hand, he may recognize the practical advantages of an education and realize that there are many things which are beyond his grasp unless he improves his education. On the other hand, his long history of failure in academic settings has resulted in a negative attitude toward classroom activities. Often he will have developed firmly established defense mechanisms which protect him from feelings of inadequacy and failure. It takes very little in the way of adverse experience to activate these defense mechanisms which can cause him to react violently or to withdraw from the classroom.

One type of student will be acutely aware of just what he does not know and will not want to involve himself in a situation which he feels is almost certain to expose his limitations and to result in failure. He operates with the motto "nothing ventured, nothing lost" and finds security in non-participation. Another type of student will protect his self-respect by devaluing activities that he feels he can not do well.

In view of the typically tenuous motivation of entering students, and the frequent pressure of easily activated defense mechanisms, the initial contact of the student with the program is of crucial importance. The teacher must get the maximum mileage out of whatever motivation does exist at the time the student enters the program. The teacher's strategy at this point is to immediately involve the student in the learning process, before his motivation dissipates. Once into the process, the application of principles of positive reinforcement should help to enhance the student's

motivation. At the same time, the teacher must realize that the new student, in particular, is very vulnerable to criticism, frustration, and failure. He is prone to negative reactions that may turn him off and cause him either to withdraw (physically or psychologically) or to participate in a way that interferes with productive learning (his own as well as that of other students). Two considerations are extremely important at this stage. The first is the atmosphere of the classroom and the second is the initial contact the teacher makes with the student.

Classroom atmosphere

The atmosphere in the classroom may be the most important factor in the program's success. The greatest possible motivating factor in the classroom is the development of a strong esprit de corps among teachers and students, that hard-to-define combination of elements which makes the students want to come to class.

All human social groups set values, expectations and goals. Classrooms are no exception to this principle. People get a great satisfaction from working with other people on agreed upon goals within a social context in which there is agreement as to what is good and bad, desirable and undesirable, and what are proper modes of behavior. The effective teacher works strenuously to establish a classroom atmosphere directed toward achieving academic goals. A class as a whole should recognize the importance of learning the reading and arithmetic skills and should believe that the educational program is helping them achieve these goals. The atmosphere should be such that behavior which leads toward academic achievement is reinforced. A classroom atmosphere which is indifferent or, in extreme cases, hostile toward academic achievement will make the achievement of the educational goals almost impossible.

The development of an appropriate classroom atmosphere takes time and a great deal of skill. It is obviously much more difficult to do if the initial composition of the class

consists primarily of rebels who are challenging authority and academic goals. In extreme cases, such classes may punish students who pursue academic goals. In one of the experiments we researched, exactly this situation prevailed and the result was program failure. A nucleus of students who are drawn toward academic achievement is probably essential to the success of any program. Discordant students can be introduced into such a setting but only in limited numbers. If their number becomes too great, the atmosphere may become so negative that the program cannot operate.

Initial contact

It is of utmost importance that initial motivation or hope be nurtured and developed as much as possible. The teacher needs to pay close attention to the emotional needs of the new student and to do whatever he can to get the student started on the right foot in the classroom. There are a number of obvious things that might be done. First, the teacher needs to be very careful during this period of adjustment to provide the student with as much feeling of success as possible and to avoid criticisms or rebukes which are not abvolutely necessary. At a later time it will be desirable to establish communications which will let the student know at all times how he is doing; but, in the beginning, extreme care needs to be exercised to avoid stimulating the student's defense mechanism against his feeling of inadequacy.

The student needs to appreciate the usefulness of skill acquisition to his immediate goals and his immediate interests. He is very likely to have accepted the general idea that learning to read, for example, is a good thing but he often has not really accepted the fact that reading is specificaily useful for him at the present time or that it can be fun. To the extent that the teacher can help the student see the immediate advantages of reading, his participation in the program is likely to be more effective. It is in this area that the "hooked on books" approach can be a useful approach. The student can be exposed to a wide

range of reading materials, related to his particular interests, and thereby helped to discover that reading can be fun.

The student needs to see a connection between a behavioral goal which he is willing to set for himself and the tasks assigned him in the class and very early in his participation he needs to experience success of some sort. "Nothing succeeds like success" is a trite but useful observation. By beginning with a few successes, the teacher will find that the student is more willing to venture out and try more things. Generating this first experience with success can be achieved through the process of "shaping" described earlier under Contingency Management. Some aspect, part, or approximation of the behavioral goal is selected which the student is almost certain to be able to perform. The student is given positive reinforcement after the successful performance of this mini-goal and it then becomes possible for him to advance to a more difficult task.

Constructive use of errors

Underachieving students have experienced so much failure that they have become hypersensitive to making mistakes. Many of them have low self-esteem and will interpret notice of errors as criticism and further evidence of their low competence. Yet they need constant feedback on how they are doing; otherwise they will not learn. They need to view an incorrect answer not as a failure but as a simple mistake which the student himself will have numerous opportunities to correct and which is of real value to him in achieving higher skill levels.

An important goal of the teacher is so to develop a student's attitudes and so to present feedback that feedback is accepted as information which can be used to monitor performance rather than personal criticism. The way this is done will vary to some degree depending on the student but there are some general principles which can be observed. First, the teacher needs to be very careful during the initial contact with the student to develop trust and conviction on the part of the student that the teacher is on his side and trying to help him. It is important that the student

experience early success and that information about errors be presented very carefully. If a student makes a mistake, the teacher might select some aspect about his answer which might be considered correct and give recognition to it before pointing out the part of the answer that is wrong. The way in which feedback information is given, can be important: the tone of voice, the choice of words, or the other students who can overhear it. Often it is better that the student be able to find his errors himself by correcting his own work.

Need for social interaction

For reasons that have already been discussed at length, diagnostic prescriptions and individualized learning through programmed instruction must be the basic techniques of the education program. At the same time many of the students tend to work poorly by themselves: they need personal encouragement from the teacher and the social contact with other students. In a survey of basic adult education programs, Systems Development Corporation (1971) found that programs featuring group instruction were better attended than programs featuring individualized programmed learning without any necessary contact with other students. The motivation of students in group instruction programs became stronger, while, in the individualized programs, students needed to begin with high motivation and well-formed objectives.

The program which uses a "lock-step" approach to teaching in which all students are doing the same thing at the same time, or the program which is entirely individualized with all students working by themselves are likely to lose effectiveness but for different reasons. The rigid structure of group instruction does not allow the recognition of differing student needs, while the independence prerequisite to self-instruction is often lacking in the typical student who, furthermore, needs frequent social contact. Effective teaching probably requires a flexible balance between group teaching and individualized instruction.

Students will vary in their capacity to work by themselves and to the degree that the student is able to work independently, he should be encouraged to do so. To increase social reinforcement during the learning process, four strategies can be considered.

1. A curriculum that includes some objectives which are best achieved through group teaching regardless of the range of skill level found in the class. Discussion of current event topics, discussion of work and adult roles, and field trips to expand experience are possible ways in which the general knowledge and experience of class members can be expanded.

2. Teaching aids and tutors can be used to increase the personal contact with students.

3. Peer-mediated instruction can be used to increase the interaction among class members.

4. Educational games can add excitement and interest to the class

All of the above could be regularly scheduled parts of the program. To be effective they should be focussed on the teaching objectives and structured so that they proceed without excessive demands on the time of the teacher.

Finally, one of the objectives of curriculum design should be to make as much of the program as possible pre-planned and self-administering so as to free the time of the teacher for individual contact with students as needed.

Defined objectives

The establishment of reasonable and attainable goals can enhance students' motivation and should be one of the first considerations in establishing an effective learning environment. Goal definition is often difficult, because the goal must be real for the student but the student himself may not have a realistic goal or may be suspicious of goals in general. Rather than a long-range goal that may be too distant or unrealistic to have any effect on motivation, it is usually best to try to find an intermediate goal and to orient participation towards it. Each lesson should be assigned

in relation to some purpose recognized and endorsed by the student.

Sense of progress

As has already been noted, underachieving students need continuous and frequent reinforcements from success experiences. They need to feel that they are making progress toward some goal which they view as important. Far more than the middle-class individual, the academic underachiever must be given reinforcement to assure him he is on the right path and to give him confidence he can make it. Without such encouragement, there is a strong likelihood that he will not complete the program.

This sense of progress can be obtained both from the way the program is designed and from the way in which progress is reported.

To the extent possible, the curriculum should be developed on the basis of short, self-contained modular units. These units should provide the means of realizing the mini-goals of the shaping process and of achieving realistic learning objectives. In organizing and using modular units several considerations, discussed below, are of great importance.

Each modular unit should be difficult enough to be challenging and to give a sense of achievement when it has been completed but it sould not be so difficult as to be frustrating. The teacher should consciously chart a course through the middle ground between expecting too little and demanding too much, too soon. If the unit is too easy no learning takes place, boredom ensues and the student can drop out through disinterest. If the unit is too difficult, the student becomes frustrated and feels he is unable to learn it. More serious consequences ensue from erring on the side of making the lesson too difficult than from making it too easy. These students have experienced so much failure in the past that they easily become frustrated and attempt to maintain their self-respect by either withdrawing or behaving belligerantly, and it may be difficult to get them back on the

track. The mistake of making the lesson too easy is not as likely to have as severe adverse reactions. The student may actually enjoy for a time doing something at which he knows he can succeed and it is usually easier to get him back on the track by giving him assignments which are more interesting and challenging. No teacher should, however, commit the error of under-challenging his student or generally maintaining an attitude of low expectation. By expecting very little from a student because he has a history of failure, the teacher is cheating him of the one vital thing that he must have--the right to hope for success. Studies have shown that teachers who expect very little from certain students create the conditions for a self-fulfilling prophecy, because they do not offer any challenging material for the students and bore them into tuning out and turning off.

Modular units of instruction should be arranged in hierarchical order on the basis of difficulty so that after the student has completed one level, the next level will provide an appropriate challenge to him. Mastery at each level should be required before progressing to the next higher level.

Progress should be reported to the student by formal means such as through certificates and charts. Underachieving students have been found to be highly sensitive to any report of progress and place much more value on formal reports than might be expected. The units of the curriculum should, therefore, be assigned point values which are generally equitable across units but make it a little easier to acquire points during the earlier stages of the program. Students should be granted points as they earn them and a visual record kept in their folders. Certificates should be issued through a public ceremony upon completion of a major unit of the program.

It is sometimes possible to make arrangements with the local school system to convert points earned in the program into credits toward a high school diploma. Graham Associates were able to make such arrangements in the states of Washington and California (Enright and Graham, 1975). Whenever this can be done, it operates as an effective motivator.

Alternate paths

It has frequently been observed that a student who is not learning from one method will learn if a new teaching strategy is used. The reason why this happens is not always clear but there are several possible explanations. It may be that the student has become satiated with the initial method and needs something new to revive his interest. In such a situation the new strategy serves as a change of pace. A second explanation might be that the student has associated the original method with failure. Mental blocks may keep him from learning and a change to a new method may give him a fresh start. Thus a student who was initially taught reading by the whole word method may do better if he is taught through the phonics or component skills method. Conversely some one who was initially taught by the phonics method may do better with the whole word method. A third possibility is that the student may have a learning style which is not suited to the method by which he is being taught. A shift to a method which makes use of his preferred learning style may result in significant improvement in his rate of progress.

For all of the above reasons, the teacher should have a variety of teaching strategies available for use when progress is not being achieved. These reserve strategies will provide both for a change in pace and for alternate paths to learning objectives.

Range of instructional materials

The student will work more productively when he perceives the learning materials to be interesting and/or useful. The availability of a wide range of materials helps to assure that students with varying needs and interests can find suitable stimulation. The teacher not only needs to have the resource represented by materials at all levels of difficulty and in as many areas of interest as possible, but also the skill to provide suitable materials to the individual student. When the student is interested in preparing himself for a particular occupation or job, for example, relevent materials should be incorporated into the program for that student.

The materials should be clearly presented, written for adults with substantive content and vocabulary or problems of immediate relevancy to work and everyday lives of the students.

IX.

DIAGNOSING AND TESTING

Testing procedures of many kinds have often been proposed as essential parts of education programs. Proposed procedures for teaching reading, for example, include the measurement of such diverse characteristics as vision, hearing, intelligence, vocabulary, reading comprehension, reading speed, mathematical competence, study skills, word attack skills, personality, family background, physical and mental health, and brain functioning. Although a wide variety of tests and diagnostic procedures are available, there is little agreement among experts as to which procedures are essential or desirable.

Testing procedures serve education programs to the extent that they are clearly related to three program purposes:

1. Diagnosing instructional needs
2. Evaluating student progress
3. Evaluating progress of the total program.

The procedures themselves are without merit unless they serve the program's basic purpose: the improvement of a student's skills. Diagnostic tests, for example, are useless unless they result in diagnoses that lead to effective remedial action. By the same token, tests that produce information related to the historical factors in skill deficiencies are useless, because programs cannot change the past--they are solely concerned with current skill deficiencies.

This chapter discusses commonly used tests and evaluates their usefulness to a basic education program.

IQ tests

Tests of intelligence consist of a sampling of items taken from a variety of knowledge and skill areas. The underlying idea of an IQ test is that, when a group of individuals is exposed to a common set of experiences, individuals will master the skills involved at different levels, depending on their ability. These differences can then be used to predict how well they will do in new situations requiring use of the types of skills tested. Unless the experiences are reasonably standardized, the differences will have little meaning. Also, if the tested skills are unrelated to the skills required by the criterion situation, the scores will have little meaning.

An IQ score is always a measure of proficiency in acquiring knowledge or acquiring a skill. Relative ability of members of a group can be estimated only if they have had equal opportunity to learn the knowledge or the skill. IQ tests are misused when inadequate consideration is given to differences in opportunity to master the knowledge or skills being measured. Thus, if two individuals--one coming from a middle-class and the other from a lower class family--score the same on an IQ test, the person from the lower-class family can be expected to do better in a new situation requiring the knowledge or skills measured by the test; because it is probable that he has achieved the same proficiency level with less opportunity.

IQ tests have come under considerable fire in recent years because of alleged stereotyping of students and cultural bias. One widely reviewed book, Pygmalion in the Classroom (Rosenthal and Jacobson, 1968), asserts that test scores become self-fulfilling prophecies through creating expectations in the mind of the teacher which become communicated to the student and influence his success. The high-scoring student is expected to do well, and the low-scoring student, to do poorly. The teacher's behavior toward the student is influenced by his expectations, and the students respond, in some degree, in accordance with the

way they are expected to respond. There are severe methodological and statistical problems with the data which have been used to support this proposition; but, nevertheless, it remains a distinct possibility that, in some situations and to some degree, test scores can establish prophecies which become fulfilled.

Extensive efforts have been made to develop "culture free" IQ tests. This has proved to be pretty much of a futile exercise. For such an enterprise to be successful it would be necessary to identify test items which are given equal emphasis by all cultures. It is possible, but unlikely, that test-developers could identify experiences which are common to all cultures and provide exactly the same level of learning opportunity. Even if valid test items could be found, however, the developer of a culture free test would face the impossible task of relating scores to a predicted criterion.

Some of the designers of "culture free" tests have searched for items which will not differentiate between ethnic groups. This is obviously a waste of effort, because there is no assurance that the item will predict a criterion. It is also not useful to develop a test with items measuring experience which is exclusively the concern of a particular subculture. It is obvious that only members of that subculture will be able to pass such a test. A test constructed in this way would only be useful for predicting among the members of the subculture, assuming they had equal opportunity to learn the content of the test and also assuming that the items are related in some way to the criterion which the designers are interested in predicting. The so-called "chitlins" test is an example of this kind of an enterprise.

It is recommended that IQ tests not be used routinely because they serve no useful purpose in an individualized education program. Each student can be placed at an appropriate level by tests, which will be described later, and encouraged to work at his own pace. Ordinarily, IQ scores

would provide no additional useful information.

In the exceptional instance of suspected mental retardation, the administration of an IQ test might be justified. The teacher should be very cautious in such a situation, because failure to have gained academic skills can result from conditions other than inability to learn. If the student scores low on reading achievement tests but appears to have a reasonable command of oral language and shows "walking around sense," the teacher should assume that he has sufficient intelligence to be able to learn academic skills. If, however, the student seems deficient in all aspects of adjusting to his environment, the possibility of mental retardation should be considered; and the student should be sent to a psychological clinic for specialized professional examination.

Achievement tests

There are two ways in which achievement tests can be interpreted: in relationship to norm and in relationship to a performance criteria. Traditionally developed tests; i.e., those designed to measure a person in relation to a normative group, have been labelled norm-referenced tests. Criterion-referenced tests are designed to yield measurements that are directly interpretable in terms of specific performance standards. It should be noted that a criterion-referenced test may be referenced to a normative group, and a norm-referenced test may be referenced to a criteria. The norm-referenced test emphasizes individual differences. The criterion-referenced test measures the amount learned. All tests, to a certain extent, will reflect both between-individual differences and, within-individual growth. Because of their design and development, however, most tests will do a better job in one area than the other.

Both criterion-referenced and norm-referenced tests are useful but for different purposes. The norm-referenced tests are useful for comparing the test scores and gains made during the program to the norm groups. The results can answer the question, How is this class doing in relationship to other classes? The criterion-referenced test can pin-

point the specific competence level of the student as related to specific instructional units and can answer the question, How much progress has the student made as a result of the specific instruction? The well known, commercially available standardized achievement tests are all norm-referenced. At the present time criterion-referenced tests have to be developed for each specific program.

Achievement tests can also be categorized as wide-range and narrow-range, and as tests of power and tests of speed.

A wide-range test includes items at all levels of difficulty within one test. Examples are the Wide Range Achievement Test (WRAT) and the Job Corps tests in reading (RJS1) and in math (MJS1). A narrow-range test includes a short screening test to determine approximate grade level and then a series of longer tests focussing on one or two grade levels with relatively homogeneous items. The California Achievement Test, the Stanford Achievement Tests, the Metropolitan Achievement Test, the Gates-MacGinetie Reading Test, are examples of narrow range tests.

Tests also vary as to whether they emphasize "power" or "speed." A "power" test attempts to make its discrimination among students on the basis of the difficulty of the item which the student can answer. In its purest form a "power" test would be a wide-range achievement test with no time limit. The items would be arranged in order of difficulty and the student's score would be determined by the most difficult item that he was able to answer correctly. A "speed" test in its purest form would have all items at about the same level of difficulty and would make its discrimination among students on the basis of how fast the student was able to respond to the item. The Nelson Test comes closest to being a pure speed test. Most achievement tests contain elements of both power and speed.

Using achievement test results

While achievement tests are useful adjuncts in an education program, their results should be used in the knowledge

that they may be distorted and may not actually measure achievement.

Distortions in test scores can come from a number of sources. The selection of items can be biased to the advantage of some students and the disadvantage of others. If a test has a heavy proportion of items relating to sports events, for example, the students who are interested in sports will tend to get a higher scores than those who are not. And this result will be independent of their reading ability. This would be an example of what is generally meant by culturally biased tests.

Speed of reading and level of comprehension, while usually associated, are sometimes independent of each other. From the point of view of the teacher of the adult basic education program, it is probably better to get independent measures of speed and comprehension.

Achievement tests are usually fairly long, require considerable concentration and the expenditure of energy. Test scores--particularly the scores of speed tests--are influenced by the amount of effort the student is willing to expend. Students with a history of academic failure frequently approach the test with either apprehension or indifference. The two attitudes probably stem from the same previous history of academic failure. The indifference could be a defense mechanism protecting the student from further failure. Scores can be depressed because of the attitude of the student; and, therefore, may not provide a true estimate of his ability.

Test scores can be influenced by the test taking strategies employed by the student. This is particularly true of the speed test or a power test in which no correction is made for guessing. If there is a time limit on the test the student has to know how to allocate his time and not to get diverted by spending too much time on troublesome items. If there is no correction for guessing the student who guesses on every item obtains an advantage. Experienced test takers also learn to increase their chances of guessing the right

answer by paying attention to the wording and structure of the item. A student who does not employ these strategies will score lower than those who do.

From the above it is apparent that test scores can reflect factors other than the ability being tested. It is often difficult, therefore, to estimate true progress on the basis of before and after testing. The scores on the posttest can be increased through a number of means independent of real gain in reading. These methods include: increasing the motivation of the student, teaching him strategies for test taking, and helping him recover during the early stages of the program material that he has previously learned.

In our research we have found many instances of dramatic gains or losses in test scores between two administrations which can be attributed to motivational changes. When tests are given to middle-class students it can be assumed that almost all of them will make a sustained effort. This is not the case with respect to disadvantaged students. A substantial portion of them may goof off the first time they are tested. It is then easy for a program to demonstrate success in the follow-up test by working on motivation. A program may have achieved something by having students who make an effort the second time when they did not make an effort the first time but the results do not really reflect gain in the skill tested.

There are a few rules, or test-taking strategies, which--if systematically taught--can influence test results. This may be a useful skill for the students to possess when they take employment tests or other kinds of tests which will influence their lives in some way; but--again--the gains made through this kind of change do not really reflect gain in the skill tested.

Students in an adult basic education class have often lost to some degree the skills that they have gained in school. Consequently, they may score lower on an achievement

test at the time of program entry than they would have scored when they were last in school. Just as a person who has ridden a bike in the past will recover his skills faster than a person who has never biked can learn them, a person who returns to the classroom often can obviously recover old skills, and thus show gains on achievement tests. Such gains also would not reflect real gains in achievement.

It is thus evident that achievement test gains in the early part of a student's program are likely to be contaminated with experience factors other than gains in achievement. Some of these other factors are probably reflected when spectacular gains in achievement apparently occur in the first few months of program experience. It is probably legitimate to judge program achievement on the basis of the second follow-up test rather than the first. Perhaps the research design which should be used for evaluating these programs is to give an initial test, then expose the students to test taking strategies, motivational inducement and the opportunity to recover old skills. The second test given after a six-week to two-month period would then serve as the base line for judging academic progress.

Skill component tests

Tests of component skills are always criterion-referenced and not norm-referenced and thus are used exclusively for individual diagnosis and measurement of gain. These tests are only useful when they are geared closely to the instructional program and are used to make decisions about which instructional units or strategies will be used for the particular student.

The majority of the commercial diagnostic tests are based on the assumption that the test provides the teacher with information which can be used for developing a set of objectives for the particular student. The teacher is sometimes given general advice on how test results may be applied; but, for the most part, it seems to be expected that specific application will be based on the teacher's experience and

judgment. If the program is individualized, the requirement that the teacher develop a specific prescription for each student often creates an excessive work load even if the teacher has the necessary competence.

In our review of on-going programs, we found that component skill testing was seldom used effectively and that test results usually did not appreciably influence assignments. The ideal arrangement is to have pre- and post-testing on selected skills with specific instructional units in between. We identified several efforts to accomplish this goal, with the Wisconsin Design for Reading Skill Development (Ott and Askow, 1972), perhaps, being the most systematic and comprehensive.

Initial testing

It can be expected that many entering students will feel threatened by testing, because they will associate tests with their history of academic failure. For this reason some teachers and program administrators feel that tests should not be administered at the time the students enter the program but should be delayed until the confidence of the students has been earned. The difficulty with delay is, of course, that it is difficult to make proper placements without having test results.

We have found that it is possible for a skilled teacher to gain the confidence of the student within a short period of time, and to test him early without adverse effects. It is a mistake to give a test without adequate psychological preparation, but we believe that the teacher should start at the very beginning to demonstrate to the student that information gained from testing is useful for determining what he needs to do to improve his skills.

X.

A COMPREHENSIVE BASIC EDUCATION SYSTEM

The preceding parts of this manual have developed the content and rationale for an effective basic education program. This chapter sets forth a specific and detailed design for such a system: a practical model based on the conclusions reached in earlier chapters.

The system described in this chapter is an elaboration of the New Education Program (NEP), developed by the Graham Associates of Walnut Creek, California. The NEP is the product of demonstration project experience, supported by two successive grants from the Manpower Administration, in a total of twelve sites. The NEP's core curriculum is the Job Corps Programmed Learning System, as modified by Graham Associates on the basis of demonstration project experience. Separate Manpower Administration grants were made to Manpower Research Projects of The George Washington University for the purpose of evaluating the effectiveness of the NEP demonstration projects. The results of this evaluative research indicated that the NEP comes closer to meeting essential criteria than do other programs that we reviewed.

The objectives of an ideal basic education program can, of course, be achieved through other sets of materials and through other program structures. Information on such programs can be obtained from the U.S. Civil Service Commission's Catalog of Basic Education Systems and the U.S. Department of Labor's Manpower Research Monograph, "Providing Basic Education for Manpower Program Clients: R & D Guidelines."

Characteristics of an ideal program

The general objectives of an education component for manpower programs were discussed in the second chapter. Subsequent chapters examined these general objectives in terms of specific problems and principles in the field of basic education. We are now able to outline in some detail the characteristics that a program should possess in order to achieve these objectives.

With respect to the teaching of reading, it was concluded (see Chapter III) that for most people reading is learned primarily as a total act and that the best strategy for the improvement of reading skills is to provide an environment which can supply motivation, models, feedback and practice with mastery insisted upon each step of the way. While the "wholistic" approach should be used as the primary strategy, supplementary exercises should be directed toward remediating identified weaknesses in component skills.

It was also noted that all students do not learn in the same way and that the teacher needs alternate strategies when the student fails to learn through the initial strategy. Individualized instruction is essential but, to be effective, it needs to be administered within a group context.

Although the achievement of improved reading skills, particularly in the lower levels of reading competence, involves particular problems of program design, the basic principles of an effective reading program apply generally to all the subject areas of a comprehensive basic education system. Spelled out in specific detail, these principles comprise the criteria of an "ideal basic education program, as follows:

1. The program should be primarily constructed from modular instructional units (lessons) which can be completed within a relatively short period of time, varying from 20 minutes for beginning units to several

hours for advanced units. The units should include instructional material and tests on the material which can be self-administered by the student to give him immediate feedback on his performance. Such units permit the student to be self-directive, to work at his own pace, and free the time of the teacher to provide more individualized instruction as needed.

2. The lessons should be organized hierarchically according to level of difficulty. The increase in difficulty between adjacent levels should be sufficient to provide a challenge but not so large as to risk frustrating the student because he is unable to perform at the higher level.

3. There should be a sufficient number of lessons at each level to provide the student with sufficient practice at that level to achieve mastery.

4. There should be a sufficient range of lessons at each level to appeal to varied student interests and purposes.

5. The program should have the capability of quickly and easily adding supplementary lessons in response to special student interests and purposes. For example, if students in the class are training to be auto mechanics, lessons relevant to this occupation and at an academic skill level appropriate to the students can increase the effectiveness of their learning experience.

6. Diagnostic tests should be administered at the time the student enters the program to determine the level and type of lesson to which he should be assigned. Care should be exercised to insure initial success. On the other hand, it is a waste of the student's time for him to work on materials he has already mastered.

7. On the completion of an appropriate number of lessons at a given level, a test on the materials within that level should be administered to the student. Mastery should be achieved before moving to the next level. If mastery is not achieved, more lessons at the same level should be completed and then the student's mastery of that level should be retested.

8. The program should accomodate students of various levels of academic skill who can enter and leave the program on individual, rather than class or academic, schedules.

9. Variety and change of pace should be built into the program so that the boredom often associated with programmed lesson units can be kept to a minimum.

10. Alternate teaching strategies and materials should be available so that if the first one does not work, another can be tried.

11. The instructional units should be assigned point values so that work progress in the program can be related to credits toward a high school diploma.

12. Formal recognition of progress should be given to the student.

Program structure

Figure 1 on page 87 outlines an ideal basic education program. It will be noted that the program materials are divided into three curriculum categories: core, supplementary, and alternate. The core curriculum is, of course, the curriculum upon which the greatest emphasis is placed. The supplementary curriculum is a scheduled part of the program and is used both as a change of pace and as a way of achieving specific objectives which are not easily achieved through the core curriculum.

The three principal parts of the program are reading, mathematics, and advanced general education.

Reading

The reading program is subdivided into three general ability levels. The Beginning Reading Curriculum serves the needs of the students whose reading skills are no higher than an approximate grade level of 3.5. The Intermediate or Graded Reading Curriculum, itself divided into eight levels, is for students whose reading ability is in the grade level range of 3.5-7.5. The Advanced Reading Curriculum, divided into seven levels, serves students whose reading ability is at or above the 7.5 grade level.

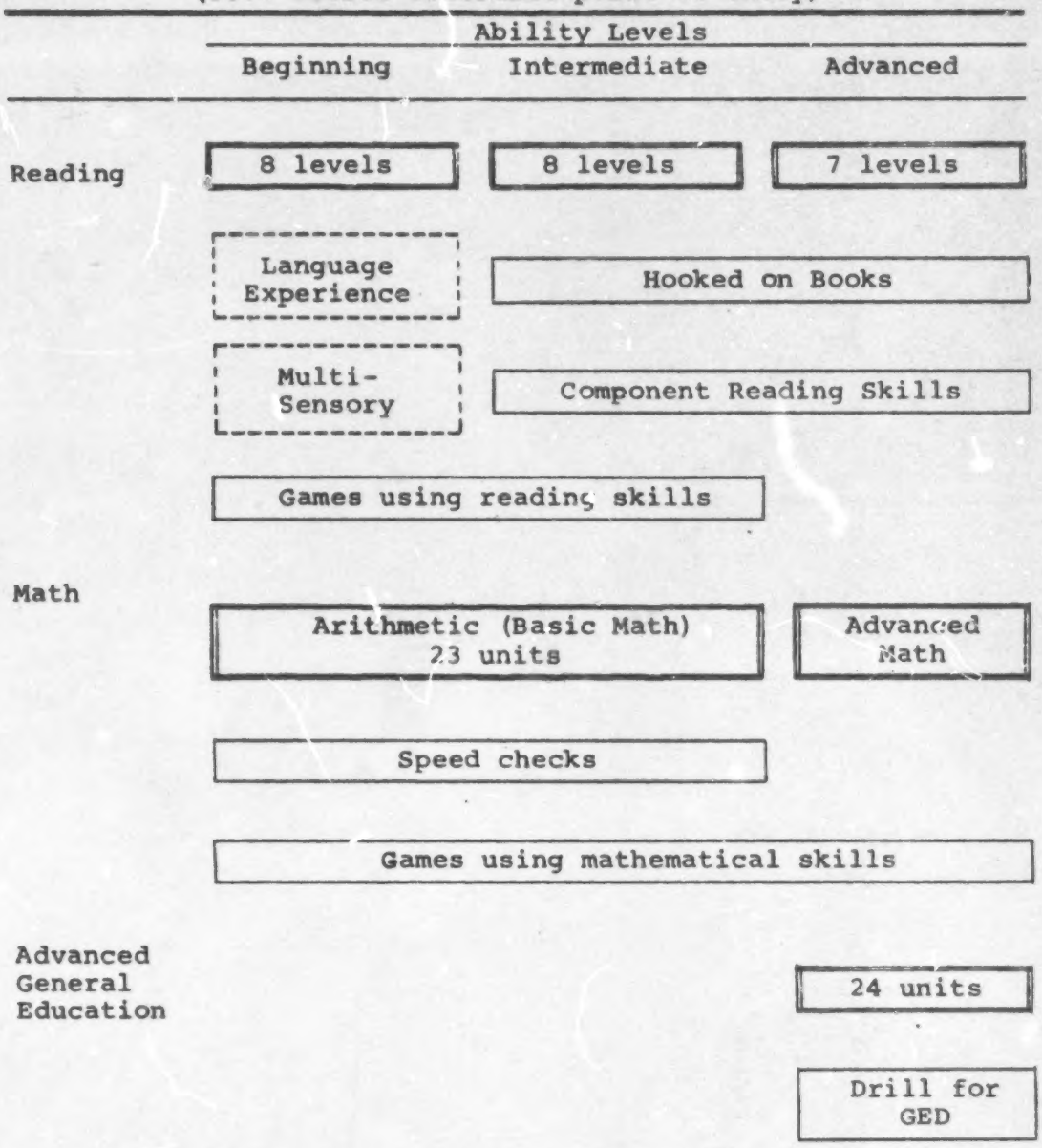
Placement

The procedure for placing students in the reading program, fully described in the Job Corps Reading Manual, is based on the results of diagnostic tests which indicate the level at which the student should begin.

FIGURE 1.

A COMPREHENSIVE BASIC EDUCATION SYSTEM

(Test scores determine point of entry)



Beginning reading

Graham Associates have replaced the Sullivan Associates' Programmed Reading series prescribed by the Job Corps with Sullivan Associates' Programmed Reading for Adults. The initial series was intended for primary grade school children and the books are juvenile in format. The new series is aimed at a more mature student population and has been found to be much more satisfactory. The series is accompanied by three teacher's manuals and consists of initial placement and eight sequential work books. The student is placed at an appropriate level through a diagnostic test and is able to proceed through the books at his own pace.

While the Sullivan Associates' materials have generally been found to be reasonably effective with most students, additional teaching strategies should be available when students do not learn by using the programmed materials.

Two alternate approaches--language experience and multi-sensory--hold promise of providing effective learning when programmed learning seems to be ineffective. Both of the approaches, discussed in detail in Chapter V, are relatively expensive in terms of teacher time, however, and may be impractical when tutors or teacher aides are not available.

The language experience approach will sometimes prove effective with students who are bored with programmed materials or find it difficult to concentrate. It involves teaching the student to read words which are already in his spoken vocabulary and this can be expected to be more interesting to the student. Detailed discussion on how to use this method can be found in Costello (1970) and Hall (1970).

The multi-sensory approach can be tried for students who do not learn with other methods. It involves a combination of visual, auditory, and kinesthetic sources of information and directions on how to use it are contained in Fernald (1943) and Gillingham and Stillman (1960).

Games

Games making use of reading skills can serve two program purposes: they can add variety and change of pace to the

classroom; and they can introduce students to activities which are fun and which they may continue outside of the classroom. The time devoted to games should be only a small proportion of the time devoted to reading, perhaps one half hour one day a week. Games can be a useful supplement to the curriculum during both Beginning and Graded Reading. Appendix B suggests games which might be used.

Graded reading

Within the eight levels of the intermediate or Graded Reading Curriculum are over 1700 reading selections from a wide variety of publishers and including a wide range of topics. Graham Associates has added to the original list additional selections to increase the range of interest. Selections range from high-interest individual story cards to short stories in anthologies. At each level, students have the option of selecting any 14 from approximately 225 available selections. Experience has shown that, at each ability level, students have found many selections appealing to their particular interests.

The reading selections are lessons, and each concludes with questions that the student must answer. An answer key is used by the student to score his own work except that the teacher scores every fifth selection. When the student has achieved scores of 80 percent or more on 14 selections, he will take the Level Advancement Check (LAC) to find out whether he is ready to move up to the next level. The LAC is administered by the teacher, and if the student scores 80 percent or more on the LAC, he moves up to the next level. If not, he continues working at his old level until he has achieved scores of 80 percent or more on five more selections. He is then administered another LAC at the same level. If he fails again, he needs to complete five more selections at 80 percent before taking the LAC again. The student will then move up to the higher level whether he passes the third LAC or not. The teacher, however, will have started giving him more individual attention after the first LAC failure and will continue to tutor him closely and attempt to resolve

his difficulties with the selections when he moves to the next higher level.

For the convenience of students and teachers, the system includes a master index of all materials in the Graded Reading Program, organized by level and subject matter/interest area. Each level includes selections relating to science, jobs, science fiction, sports, etc.

Adding new reading materials to the existing system is made easy through the use of a readability formula, the Powers and Ross adaptation of the revised Farr-Jenkins-Paterson Readability Formula (Enright and Graham 1975). The master index can easily be updated as new reading materials are added and old ones removed. Each teacher should review the selections and then add selections apecifically related to the interests and goals of current students.

In contrast to the formality and structure of core and alternative curricula in the graded reading program, the supplementary curriculum, "Hooked on Books" provides an informal and unstructured approach. The recreational reading in this approach (discussed in Chapter V) serves the program purpose of enhancing motivation to practice and expand reading skills by demonstrating that reading is fun. It can be a very useful program adjunct.

To implement the "Hooked on Books" approach, a large number of books and magazines should be easily available. They should be on display racks where their attractive formats can make their strongest impression.

Efforts to encourage recreational reading only become practical when the student enters Graded Reading. His reading skills are too undeveloped while he is in Beginning Reading for him to read independently to any significant degree. When he starts to read independently, the teacher should keep the goal of encouraging recreational reading as an important objective.

Component skills

The student should spend about fifteen minutes a day, on the average, in skill exercises designed to correct

diagnosed areas of reading weakness. Two sets of skill exercises materials are recommended: the Mott Basic Language Skills program which is an integral part of the Job Corps Program, and the Wisconsin Design for Reading Skill Development (Otto and Askov, 1972). Both sets of material provide for initial diagnosis, exercises in weak areas, and posttests to determine degree of mastery. The work on component skills should continue as long as the student has evident areas of weakness.

Advanced Reading

The Advanced Reading Program is used by students who have scored sufficiently high on the initial diagnostic test or who have completed the Graded Reading Program. It is used primarily as an enrichment activity for students participating in the Advanced General Education program, where it provides a change of pace from the rigors of studying specific academic subjects.

There are seven levels in Advanced Reading. The student works at one level until he has achieved scores of 80 percent or more on seven selections at that level; at which time he takes an LAC. If he passes, he goes on to the next level. If he fails, he must achieve scores of at least 80 percent on five more selections before he is retested. If he fails a second LAC test, he completes the remaining selections and then goes on to the next level.

The Mathematics Curriculum

This curriculum has a carefully designed system of diagnosis and prescription and has proven to be extremely effective in all NEP sites. The curricular materials have benefited from the addition of supplements developed by the Job Corps and by the Graham Associates.

Placement

The initial diagnostic test makes a rough determination of the level of the student's ability. A more detailed diagnosis is then made to determine exactly where within that level he should be placed.

Basic Math Program

The Basic Math Program includes eight levels: addition, subtraction, multiplication, division, fractions, introduction to measurement, decimals and percentage, and personal math. It is designed to provide a sixth-grade math education for those who successfully complete the program. When the student is placed in the system, he is given a checklist which outlines sequentially the exact steps which he must take to complete that unit. The program utilizes self-instructional texts and self-administrable tests so that students can learn on their own. This enables students to concentrate on the skills they do not have and to by-pass those skills they already possess. There are 23 units in the program and the student is permitted to "test through" any of these units if he can pass the appropriate test with a score of 80 percent or higher.

When a student completes all of the instructional activities on the Unit Checklist, the teacher reviews his work and decides whether the student is ready to take the Unit Test. If he scores 80 percent or more on the Unit Test, the student proceeds to the next unit. If he scores less than 80 percent, he is assigned remedial work on the unit and then retested. The cycle of remediation and retesting continues until the 80 percent criteria is met.

When all units in a section have been mastered, the student will take the Section Test (ST). The ST provides review retesting on the units within the section and the results on the ST are evaluated unit by unit. Students must score 80 percent or higher on all of the unit sub-tests in order to successfully finish the section. If the score is below criterion on one or more unit sub-tests, the student is to review the work on the unit(s) and successfully pass an alternative form of the unit test(s) before receiving credit for the section.

The diagnostic unit tests are constructed so that teachers can derive diagnostic and prescriptive information from

their use. Each test consists of items carefully selected because they assess performance in specific math skills. Each item has been classified in terms of the skill tested. The list of categories--called item types--used to classify the items along with an index number appears in the Skills Directory. After noting the index numbers for the items missed on the test, the teacher can look up suggested specific remedial work in the Skills Directory. The usefulness of this system has been greatly increased by the development by the Graham Associates of a Teacher's Math Supplement (Loebman, 1975) which is keyed to the item type numbers, and includes a variety of remedial approaches and alternative strategies which teachers can employ as they assist students to achieve proficiency in basic computational skills.

Speed checks

Speed checks are another useful addition to the math program. These are timed, 100-question tests in addition, subtraction, multiplication, and division. They are used in a fun/competitive way to sharpen students' skills. Each speed check takes three minutes and is easily administered and scored.

Even after students qualify in all four operations, they should continue to take speed checks so that their skills will continue to improve. The recognition of outstanding performance with certificates or other marks of merit has been found to serve as an incentive for growth.

It is important to use speed checks as often as possible because speed and accuracy in the computation of whole numbers is a very useful skill. With sufficient practice, the poorest student in terms of math aptitude can perform these tasks as well as the best.

Games and group exercises

A major problem with the core math curriculum is that students tend to get bored with programmed instruction and workbook drill. To counteract this tendency, Graham Associates has developed a number of math games and exercises

requiring group participation. Besides adding a new dimension of interest to the program, these activities are in themselves effective ways to learn. These games and exercises are coordinated with the levels of the math program and are described in the Teacher's Math Supplement which is currently in use at all NEP sites.

Advanced math

The NEP includes an advanced math component, the Sullivan Programmed Math Workbooks. These books cover Algebra 1 and 2, Geometry, and Trigonometry, and are identical in format to those used in Basic Math. The addition of these materials goes far to correct an apparent deficiency in the Job Corps System. In addition, Graham Associates is developing checklists, diagnostic/unit tests, and optional ancillary materials which will give this component the same format as the rest of the curriculum.

Advanced General Education

The Advanced General Education program was developed by the Job Corps with the specific purpose of preparing students for the high school equivalency examination (GED). This curriculum is also in programmed instruction format, allowing students to progress at their own speed. It has been found in the NEP sites to be a fully adequate education component providing students with a wide range of subject matter coverage. The lessons, while intended for young adults, can easily be understood by any student who reads at the seventh grade level. The short booklet format permits students to set short-range goals and achieve success within a reasonable period of time.

The program consists of three levels, divided into 24 units, and further, in 24 specific lesson booklets. Instruction is offered in the five areas covered on the GED examination, i.e., mathematics, English grammar, English literature, natural sciences and social studies.

Before entering each unit, the student takes a screening test which indicates whether he has a mastery of the material contained within that unit. If he has, he can skip that entire

unit and go on to the next screening test. Otherwise, he begins work in the first lesson of that unit. At the end of each lesson there is a test reviewing all the lessons in the unit. As in the reading and math curricula, there are definate procedures to be followed if the student fails to score at least 80 percent on the unit test.

Graham Associates has found it desirable to give more attention to "test-taking" skills for those students whose goal is passing the GED. They, therefore, have supplemented the NEP with other materials which provide drill in answering questions prepared in GED-exam format. The five-book GED series published by the Spokane, Washington Community Colleges has been introduced into NEP sites with great success. It has also been found that commercially available GED drill books, such as Barron's How to Prepare for the High School Equivalency Examination, can be used effectively.

The programmed instruction format of the AGE curriculum creates the usual problem of potential boredom. High-interest supplementation is, therefore, advisable. The teacher should add reading and writing assignments, group discussions, fact-finding trips, and other similar activities.

Accreditation

Graham Associates has been successful in the states of Washington and California in arranging for NEP units to be converted into credits toward a high school diploma. This provides an alternative goal for students and has been found to be a strong source of motivation. Since some school districts are looking for effective alternative education programs, the possibility of developing this type of cooperation between manpower programs and schools should be borne in mind by program administrators.

Physical requirements

In a basic education classroom, space and furniture requirements are very different from those of a conventional classroom which typically has student desks or chairs facing the teacher's desk and blackboard-lined walls. Furniture

should be moveable and the students should have easy access to the materials. Modular furniture is desirable but regular tables that will accommodate four or five students are acceptable. The teacher's desk should not be the focus point in the room and should be placed so that the teacher can easily interact with the students.

The room should be arranged so that it is possible for students to work either individually or as part of a group. A large space needs to be available for multi-class activities. Some students need some separation in order to concentrate. Provision for individual study carrells, or the equivalent, is desirable; but care should be exercised not to create too much separation. Individual students should not have closed study rooms of their own nor should the teacher or teacher aide be separated from the students. The concept of a community of learners should be encouraged. On the other hand students who want to work by themselves should be able to do so without being unduly disturbed by other students.

With respect to the storage of materials, Job Corps and Graham Associates have designed specific storage procedures and furniture (Enright and Graham, 1973, 1975).

It is advantageous if there is an area near the classroom which can accommodate students at break periods or other periods of relaxation. This area will reduce disruption for students who are trying to study; and, the area, equipped with vending machines, may also be used as a lounge.

The site of the education program should be easily accessible to the students. If it is too difficult to reach by public transportation, the program should provide special transportation. If at all possible, it should be located away from the regular high school or continuation school campus in order to avoid undesirable competition and negative memories. Outside distraction to students trying to study should also be avoided.

It is important that the space used for the education program be reserved exclusively for this purpose. If other

activities are conducted in the same space, materials may disappear or become disorganized, and students' records may be lost. Scheduling conflicts may also provide unnecessary distractions for the students. Because of the quality of materials and the need to have the materials organized at all times, it is impractical to move materials from one room to another. In addition, if the space is the exclusive and permanent home of the education component, students and teachers can arrange and decorate it as they wish.

Teacher qualifications

The quality of the teacher will have a decisive effect on the success of the program. Formal qualifications have been found to be less important than the personal characteristics that the teacher brings to the job. In a field test of selected adult basic education systems, Greenleigh Associates (1966) found that certificated teachers are not essential to learning situations involving disadvantaged students and educational material similar to those recommended in this manual. High school graduates with proper motivation and personal qualities performed as satisfactorily as teachers with more extensive teaching qualifications.

Previous experience in teaching and possession of recognized credentials can, however, be useful in some circumstances. If, for example, the program design includes securing high school credits for work completed in the education component, it is essential that the policies of the local school district be taken into account. If school district policies require that the class be taught by a credentialed teacher in order for the program to be accredited, it would be wise to establish the credential as one of the teacher qualifications. In the absence of local requirements for credentialed teachers, probably the best policy to follow is that the greatest weight should be given to personal qualities; but, in choosing between candidates with equal personal qualifications, consideration should then be given to previous teaching experience and training, particularly relating to adult basic

education programs.

As discussed earlier in this manual, the class atmosphere, the initial contact with the student, the use of error as information, and the skill with which positive reinforcement is supplied are essential elements in an effective program. The teacher also provides an important role model with respect to language usage and adult role behavior. His use of language should be competent and show that such characteristics as promptness, neatness, and orderliness in the classroom, ability to relate well with other people, and the ability to work within the system are all behavior examples which will help enrollees to cope with the outside world.

The teacher must be able to communicate that he likes and understands the student while at the same time keeping the activities focussed on academic progress. He must believe in the goals of the program and feel that the particular methods being employed can work. Teachers who view manpower programs as give-aways, or who look down upon program participants, will almost certainly experience great difficulty in the classroom.

Successful teachers are creative people with interests and hobbies which can stimulate students to sample new areas and broaden their horizens. Often such new-found interests will lead students to a more positive approach to the academic side of education.

All teaching jobs require energy, but this one may require even more than usual. It is important to choose a person who can put in the required hours in the classroom and still have the energy to deal with the students during non-class hours.

In some circumstances ethnic background, appearance, and sex may be factors to be considered. Our experience indicates that they become of little importance if enough consideration is given to the other factors discussed above.

Teacher Aides

If at all possible in an individualized instruction program, it is best to use a combination of a teacher and a

teacher aide. Having two people in the classroom permits more individual attention and more flexibility in the use of the teachers than if each teacher had a separate class. The teacher aide does not need the same qualifications as the teacher and, as a matter of fact, may be a recent graduate of the program. The important qualifications for a teacher aide are ability to relate to the students, interest in the program, energy, a sense of responsibility, and language competence.

Class size

The program described in this manual can accommodate students whose skills range from illiteracy to high school level. The number of students who can be serviced effectively by a teacher and a teacher aide depends, among other things, upon the number of students in the class whose skills are below the third grade level. In any education system, such students require a great deal of one-to-one attention. As a general guideline, one teacher with an aide can usually handle 20-25 students at a time if no more than five or six are in the Beginning Reading Program.

Classroom management

Many aspects of classroom management have been discussed in detail in earlier parts of this manual. The following discussion emphasizes the most significant principles and suggests references which might be consulted by the teacher.

Class atmosphere

When the program is initiated, it is essential that an esprit de corps be developed which reinforces academic achievement and that this attitude be maintained. It is important that the new system be implemented and presented to the students with enthusiasm and energy. A significant proportion of the initial class of students should be interested in helping to make the program work. If the program is forced on a classroom of reluctant students, it takes an extremely skilled teacher to develop a positive classroom atmosphere.

Initial contact

The importance of the initial contact has been discussed earlier. It is essential that maximum use be made of whatever initial motivation the student brings to the program. With careless or inexpert handling, motivation can quickly dissipate, and thereby greatly increase the difficulty in helping the student make progress in the program.

Positive reinforcements

The importance of creating a successful experience and then building on it have been emphasized earlier. Contingency Management is the technique used for doing this, and extended discussions of the use of this technique in the classroom are contained in Ackerman (1972) and Haring and Phillips (1972).

Student resources

Individualized instruction, basic to this model, can lead to two potentially significant problems: the demands on the teachers time may be excessive and the needs of the students for social interaction may not be met. Use of class members to help teachers can help solve both of the above problems by freeing the time of the teacher and by providing contact between members of the class, in the context of achieving academic goals. Use of students as tutors and peer-mediated instruction are useful techniques through which students can be involved in the teaching process. Peer-mediated instruction is extensively described by Rosenbaum (1973).

Discipline

Once the education component is in operation, disciplinary problems will inevitably arise. There are no pat answers as to how to handle particular situations. In no other area is "how to do it" so dependent on timing, individual personality and style, and the specifics of the particular situation.

Before beginning the first class, teachers and administrators need to give careful thought to how to handle "misconduct" of various kinds within the education component.

Students need to know the basic parameters in which they will be expected to function and some basic agreements need to be reached for dealing with such common problems as: tardiness and absenteeism; severe lack of progress (wasting time); disruptive behavior in the classroom; and hostility toward the teacher. These are common discipline issues for which the staff should be prepared.

Disciplinary rules should be known in advance by all students, should be applied consistently, and should be clearly relevant to the program goals. The program should avoid a long list of petty rules which may cause the students to react to the education program as an extension of the school systems they have already rejected.

Teachers need to deal with disciplinary problems themselves and not pass the buck to counselors or administrative officials. A learning environment can be maintained only if the right of students to spend their time productively is protected and disruptive behavior is controlled. Teachers who are not able to maintain essential discipline lose respect and credibility. Teachers who are petty or discipline behavior which is not relevant to program goals hinder the program effectiveness.

Conduct of class

If a teacher comes from a conventional education system, he will find that his teaching role changes dramatically with the introduction of programmed instruction. He no longer will be lecturing or necessarily working with the entire class as a unit. Much more of his time will be spent moving among students and working with individual students as needed. He becomes more of a facilitator and organizer of activities. He helps students work on their own in a de-pressurized setting, and provides monitoring of individual progress and problems. At the same time he arranges changes of pace and varied activities. During individual work periods, most talk will be between teacher or teacher aide to one student at a time in individual conferences. Such talks

could occur in a corner of the room, somewhat separated from the students' working tables. During tutoring periods, pairs of students will be working together and need not disturb adjacent pairs unduly. During group discussion, of course, the total class will be involved.

In a conventional classroom the major focus of the teacher is on curriculum planning and execution. The focus of the teacher in the program described in this manual should be on scheduling and monitoring self-directed activities and remediating problems.

Installation

The program described in this manual includes guides and other materials to familiarize teachers and administrators with the program. The system is not difficult to learn. It is critical, however, that it be learned before the students arrive. Nothing will get the program off to a worse start than to have both teachers and students fumbling with a system no one understands.

Initial teacher training should be conducted by someone who is thoroughly familiar with the program, such as the Graham Associates, or teachers in manpower programs using the NEP. Such a trainer can save the teachers much time by clearly explaining the system, suggesting how the room should be arranged, how materials should be displayed, how best to keep student records, etc. In the present stage of development of the system, trainers can also be useful by helping to coordinate procurement of materials from the numerous sources involved and to direct the implementation effort.

At present prices, the cost of materials to serve 75 students for one year is estimated to be less than $2500. The annual replacement cost is estimated at $750-$850. As a practical matter, many students do not work in all three areas of the curriculum. Thus it can sometimes be arranged so that more than 75 students can be served at this cost.

APPENDIX A

BACKGROUND INFORMATION

The data on which this manual is based came from a wide variety of sources that can be broadly categorized into three kinds: relevant research conducted by the author; the literature of the field including other research results; and reconnaissance studies of promising programs. The information net used in collecting new data and the author's studies pertinent to this manual are described below.

The information net

The literature was searched carefully to identify relevant research results, significant issues, and programs reported to be successful.

Knowledgeable persons were interviewed and identifications of successful programs using various approaches were sought from them. The administrators of reportedly successful programs were contacted by mail or telephone; and, if it appeared that the programs were indeed successful, site visits were arranged. Programs were visited in Washington, D.C.; New York City; Alabama; South Carolina; Kentucky; Indiana; West Virginia; Oregon and California.

Programs reported to be successful frequently were found to be in early phase of operations, and reported success, to be more of a reflection of initial enthusiasm and anticipation than of achievement. In such instances, arrangements were made to follow the program's progress over a period of time.

Original research

The author has conducted five studies involving the education component of manpower programs. In two of the studies, the research focused on the total program of which

education was a component; while, in the other three, the focus was on the education component. These studies were:

1. A Longitudinal Study of the Out-of-School Neighborhood Youth Corps (NYC) Program in Four Cities. This study was conducted between 1966 and 1970 and included school dropouts in four cities--Durham, North Carolina; Cincinnati, Ohio; East St. Louis, Illinois; and St. Louis, Missouri.

2. A Longitudinal Study of the out-of-school NYC-2 Program in Four Cities. This was a continuation of the earlier study in which a comparison was made between the initial and the revised design of the NYC program. School dropouts were studied in Atlanta, Baltimore, Cincinnati, and St. Louis. Data were collected between 1970 and 1974.

3. The Accelerated Learning Experiment. An experimental educational component based on the Job Corps materials was installed in Pittsburgh and St. Louis. Participating teachers trained for three days at the beginning of the program and then were expected to implement the program locally. The research design included before and after measures.

4. Two research studies conducted in cooperation with the Graham Associates in which the Job Corps system as modified by the Graham Associates was studied in a variety of research sites. This modification involves intensive monitering by the Graham Associates. The research design was similar to that used in the Accelerated Learning Experiment.

Six workshops devoted to basic education were held in connection with these studies. The workshops reflected the insights and experience of program teachers and administrators as well as the views of other professionals in the field.

Finally, as an outgrowth of the research and of the workshops, some experiments were conducted on particular approaches to reading problems and the acquisition of reading skill. This special reading research included:

1. A study of the "Hooked on Books" approach, provided by Vicore, Inc. to a sample of NYC enrollees in Baltimore

2. The relationship between visual problems as determined by optometric examinations and reading problems was studied for a sample of students in a Philadelphia junior high school

3. A review of the effectiveness of college-based education programs for NYC-2 enrollees in Baltimore and St. Louis.

APPENDIX B

SUPPLEMENTARY MATERIALS RELATED TO READING, LANGUAGE SKILLS, AND MATHEMATICS

Games related to reading and language skills

Phonetic Word Analyzer

A drill device using interchangeable cardboard discs to build words phonetically. Consonants and consonant blends are matched with word endings by turning the disc.

Milton Bradley Company, # 7507

Antonym Poster Cards

30, giant-size cards on durable, white tagstock, designed to teach the reading, spelling, and use of words with opposite meanings, 120 different words.

Milton Bradley Company, # 7529

Homograph Poster Cards

60 examples of words which have the same spelling but may be used in different settings to hold different meanings. Each word used in 2 simple sentences to illustrate different meanings. Second color used to emphasize subject word on each card.

Milton Bradley Company, # 7552

Homonym Poster Cards

30, giant-size white cards, printed in 2 colors on each side. 60 pairs (120) of words which sound alike but have a different meaning. Simple sentences illustrate the use and meaning of each word. Excellent for teaching spelling and building vocabulary.

Milton Bradley Company, # 7510

Synonym Poster Cards

30, giant-size cards on durable white tagstock, designed to teach the reading, spelling, and use of words with the same or similar meanings. 120 different words.

Milton Bradley Company, # 7513

Popular games that can be used in an education program

These games are popular family games which are readily available at most of the large department stores or at stores specializing in the sale of educational materials. The price range is between one and five dollars. Most of these games are for small groups and can be completed within one hour.

Games related to reading and language skills

1. Go to the Head of the Class
2. Password
3. Phonetic Quizmo
4. Probe
5. RSVP
6. Scrabble
7. Scribbage
8. Spill and Spell
9. Sentence Builder
10. Sentence Scrabble
11. Split Word
12. Tuf Abet
13. Vowel Dominoes

Games for improving memory, perception, thought processes, and concentration

1. Brain Drain (individual use)
2. Careers
3. Checkers

4. Chess
5. Clue
6. Concentration
7. Instant Insanity (individual use)
8. Jeopardy
9. Score 4
10. Stratego
11. Strategy
12. Pythagoras
13. Kwazy Quilt
14. Hi-Q
15. Double Hi-Q

Math Games

Arithmetic Quizmo

A fun game for valuable practice in number combinations (addition, subtraction, multiplication, and division). Contains cards for the entire class and is similar to Bingo.

Milton Bradley Company, # 9309 and 9301

Quinto

A mathematical Scrabble game intended to be played using multiples of five, but which can be used for other multiples to strengthen all of the multiplication and addition facts.

J.L. Hammett Co., code 82812#GA-160

Heads Up

A fun game in which numerals and symbols are thrown on dice from which the student forms true mathematical sentences on a playing board. Involves all four operations of arithmetic.

J.L. Hammett Co., code 82804#944

Real Numbers Game

Students roll five numeral and operation cubes and compute as many numbers as possible from the set of naturals, integers, rationals, or reals. Good practice in computation.

Creative Publications, # MGP-22

TUF

Based on a number sentence, TUF is a series of games progressing from simple ones involving only the operations of addition and subtraction to more advanced mathematical operations and concepts: multiplication, division parentheses, fractions, decimals, negative numbers, number systems in other bases, ratio, proportion, percentage, and even exponential powers, fractional roots, logarithms, etc. The set contains 60 3/4 inch colored and impressed cubes, 4 blank cubes as extra replacements, 3 timers, 1 rule book, and 1 container.

Cuisenaire Company of American, Inc., # M-6

3-D Dominoes (Grades 3-6)

45 plastic game pieces which have 3 sections to be matched. Game includes 6 example charts and instructions plus a solitaire game.

Miles Kimball Company, # K4799

Radix (Grades 5-12)

Deck of 52 playing cards containing 4 numeration suits: base 2, base 5, base 10, and base 12. Played like "rummy" for 2 to 4 players but can be used as a solitaire game.

James W. Lang Company

Competitive Fractions Game (Grades 3-6)

A game for 3 to 5 students which reinforces a student's ability to understand and mentally add simple fractions of 1/4, 1/2, and 3/4. Moves are dictated by cards. Includes fractional pieces, playing cards, 3 playing boards, and instructions.

Selective Educational Equipment, Inc., # GNO439

Fraction Dominoes (Grades 3-6)

This set of dominoes consists of 28 wooden pieces to show relationships among numbered, named, and pictured fractions. For example, a circle showing a 1/3 pie section may be matched with either a domino which reads "1/3" or one which reads "one-third."

Selective Educational Equipment, Inc., # ARN612

Come Out Even (Grades 4-8)

Two decks of cards, each containing 52 cards. Students add simple fractions and find common denominators. Deck A shows halves, fourths, eighths, sixteenths; Deck B shows halves, thirds, sixths, ninths, and twelfths. The games are similar to "rummy" and are for 2 to 6 players.

Holt, Rinehart, and Winston, Inc., # COE-A and COE-B

Action Fraction Games (Grades 4-8)

Games for up to eight players designed to develop concepts and skills with fractional numbers. Players roll fraction-marked cubes. The Circles Set and Squares Set would probably be most useful.

Math Media, Inc., # M320-1

IMOUT (Grades 4-8)

Rules are similar to Bingo and while call cards are preferred for the faster method of playing, there is also a spinning device. Each is a game in which the entire classroom may participate at the same time. (48 cards in each game)

- Addition and Subtraction
- Multiplication and Division
- Fractions

Imout Company

Wiff 'n Proof (Grades 9-12)

The 36 red and blue logic cubes, 3 playing mats, one-minute timer, and teacher's manual provide 21 challenging games involving "well formed formulas" in logic.

Creative Publications, # MGP-28

Checkline (Grades 1-12)

The objective of this three dimensional tic-tac-toe game for two, three, or four persons is to get four chips in a line either vertically, horizontally, or diagonally on one level or all four levels.

Creative Publications, #MGP-15

Haar Hoolim Perception Games (Grades 6-12)

Games using the designs on the back of 36 cards require the students to visualize the cards in varying combinations in order to form patterns. Set includes a series of 15 games, 3 forms of solitaire, 10 strategy games for 2 to 4 players, an ESP game for 2 to 6 players, and a party game.

Selective Educational Equipment, Inc., # ALP001

Aftermath

Self-explanatory booklets containing cartoons, humor, designs, puzzles, codes, and games to reinforce the curriculum. Ditto masters also available.

Creative Publications, # MEP-9

Addresses of companies referenced above

Creative Publications
P.O. Box 328
Palo Alto, California 94302

Cuisenaire Company of America, Inc.
12 Church Street
New Rochelle, New York 10805

J.L. Hammett Company
Hammett Place
Braintree, Massachusetts 02184

Holt, Rinehart, and Winston, Inc.
383 Madison Avenue
New York, New York 10017

IMOUT Arithmetic Drill Games
706 Williamson Building
Cleveland, Ohio 44114

James W. Lang
P.O. Box 225
Mound, Minnesota 55364

Math Media, Inc.
P.O. Box 345
Danbury, Connecticut 06810

Miles Kimball Company
41 West Eighth Avenue
Oshkosh, Wisconsin 54901

Milton Bradley
Springfield, Massachusetts 01101

Selective Educational Equipment, (SEE), Inc.
3 Bridge Street
Newton, Massachusetts 02195

APPENDIX C

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